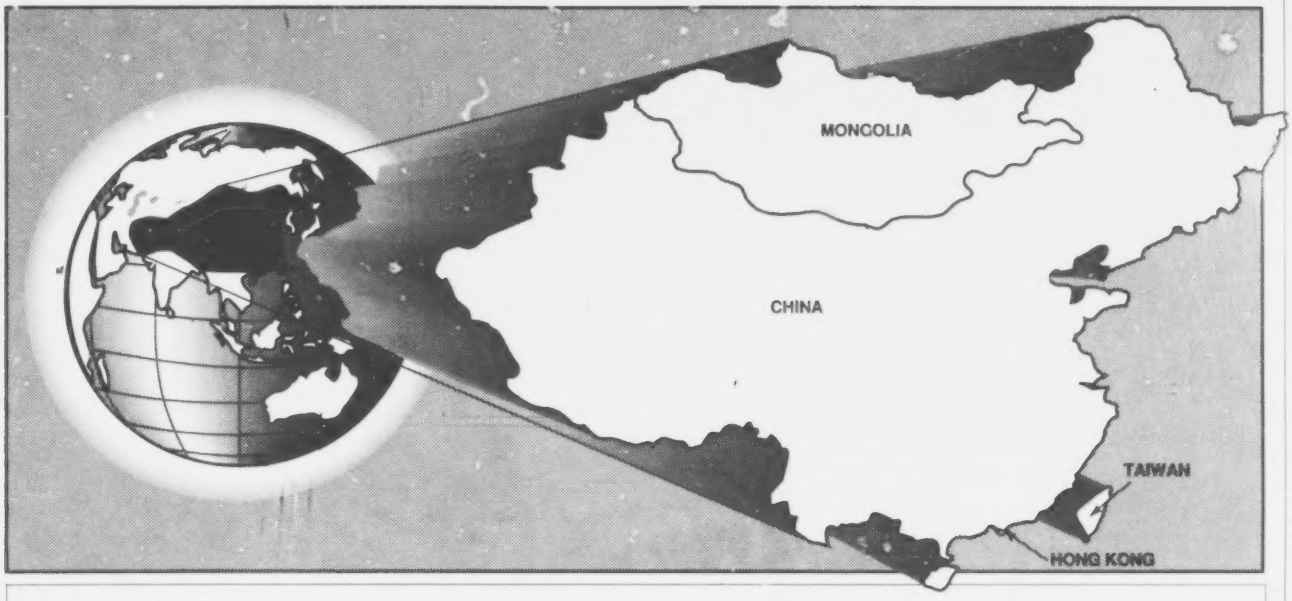
C 441/2/988



THE MINERAL INDUSTRIES OF

CHINA, HONG KONG, MONGOLIA, AND TAIWAN

By E. Chin and John C. Wu

1988

INTERNATIONAL REVIEW

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

I 28.37/a 2:

READEX FICHE best copy available

THE MINERAL INDUSTRIES OF

CHINA, HONG KONG, MONGOLIA, AND TAIWAN

U.S.
DEPARTMENT
OF THE
INTERIOR

Manuel Lujan, Jr.
Secretary

BUREAU OF
MINES

T S Ary
Director

1988

Contents

China 1
Production 2
Trade 3
Commodity Review
Metals 4
Aluminum 4
Antimony 4
Copper 4
Gold 18
Iron and Steel 19
Lead and Zinc 20
Rare Earths 20
Tin 20
Titanium 21
Tungsten 21
Industrial Minerals 21
Barite 21
Cement 21
Fluorspar 21
Fertilizer 21
Salt 21
Talc 22
Mineral Fuels 22
Coal 23
Petroleum and Natural Gas 23
Hong Kong 24
Production 24
Trade 25
Mongolia 36
Commodity Review
Metals 36
Industrial Minerals 38
Taiwan 38
Production 40
Trade 40
Commodity Review 41
Metals 41
Aluminum 41
Copper 41
Iron and Steel 41
Industrial Minerals 49
Mineral Fuels 49

Tables

Table 1.—China: Estimated Production of Mineral Commodities 5
Table 2.—China: Apparent Exports of Mineral Commodities 7
Table 3.—China: Apparent Imports of Mineral Commodities 13
Table 4.—Hong Kong: Production of Mineral Commodities 25
Table 5.—Hong Kong: Exports and Reexports of Mineral Commodities 26
Table 6.—Hong Kong: Imports of Mineral Commodities 31
Table 7.—Mongolia: Production of Mineral Commodities 37
Table 8.—Mongolia: Apparent Exports of Mineral Commodities 37
Table 9.—Mongolia: Apparent Imports of Mineral Commodities 38
Table 10.—Taiwan: Production of Mineral Commodities 42
Table 11.—Taiwan: Exports of Mineral Commodities 44
Table 12.—Taiwan: Imports of Mineral Commodities 50

For further information, please contact
The Branch of Far East and Australia
The Division of International Minerals
U.S. Bureau of Mines
2401 E St., NW, MS 5205
Washington, DC 20241-0001
Telephone: (202) 634-1272
Fax: (202) 634-4654

THE MINERAL INDUSTRIES OF

CHINA, HONG KONG, MONGOLIA, AND TAIWAN

By E. Chin and John C. Wu

CHINA[1]

Under the seventh 5-year plan (1986–90), the Chinese Government continued to implement reform and to open the country further to the outside world in order to accelerate the growth of its national economy. As a result of expanded foreign economic exchanges and domestic achievements in education, science and technology, and cultural and public health undertakings, the national economy was strengthened. In 1988, there was impressive growth in the Chinese economy. The gross national product (GNP) grew by 11.2% reaching $373.4 billion;[2] the national income grew by 11.4% to $310.9 billion. The major problem in the Chinese economy was the imbalance between high demand and insufficient supply. Chronic shortages resulted in price increases and high inflation, which averaged 19% for China as a whole and about 30% in urban areas. Macroeconomic stability took precedence over market-oriented reform initiative. Because of rapidly growing inflation, the Government reimposed price controls and rationing in major cities in the fall of 1988.

China continued to be a major world producer of minerals, metals, and fuels. Output of the principal commodities continued to rise. The largest increase in production was salt which rose 24% in output in 1988; followed by sulfuric acid, 14%; cement, 12%; soda ash, 9%; caustic soda, 7%; and steel, 6%. For fossil fuels, the increase in output of natural gas was 14% in 1988; followed by coal, 3%; and crude oil, 2%. The output of electricity by thermal-fired powerplants rose by 9% while that for hydroelectric powerplants rose 7%. Although China's overall energy output has increased annually since 1980, the growth in demand continued to outstrip the supply.

An important economic development strategy was the Government's emphasis on creating export industries and the increased reliance on utilizing foreign investment in coastal areas. In addition to China's four special economic zones (Shantou, Shenzhou, Xiamen, and Zhuhai), Hainan was elevated to provincial status in 1987 and declared China's largest special economic zone in 1988 thereby enjoying the most liberal investment policy in China to date. The 14 coastal cities with economic and technological development zones to absorb foreign investment and technology were Beihai, Dalian, Fuzhou, Guangzhou, Lianyungang, Nantong, Ningbo, Qingdao, Qinhuangdao, Shanghai, Tianjin, Wenzhou, Yantai, and Zhanjiang. There were 478 cities and counties freely open to foreign investment and tourism.

The total value of agricultural and industrial output in 1988 was $639.3 billion. The output value of the agricultural sector grew by 3.2% to $151.4 billion; the output value of the industrial sector grew by 20.7% to $487.9 billion. The total industrial output value includes $78.7 billion contributed by village-run enterprises. By ownership, the output value of the state-owned sector increased by 12.7%; the collective sector by 28.8% (of which rural enterprises accounted for 35%); the private sector by 46%; and for Sino-foreign joint ventures, cooperative enterprises, and wholly owned foreign enterprises by 97%.

The output value of heavy industry increased 18.8%, reaching $246.6 billion in 1988. The processing sector grew more rapidly than the power and raw materials sectors, further aggravating the imbalance in the overall structure of industrial production capacity. The growth in output of selected, major industrial products was salt, 24.5%; sulfuric acid, 11.7%; soda ash, 9.6%; electricity, 9.2%; cement, 9.1%; rolled steel, 7.0%; fertilizers, 5.7%; coal, 4.5%; and crude oil, 2.2%. The major industrial commodities showing a decline in output included marine vessels, 20.7%; sugar, 10.0%; locomotives, 7.3%; and timber, 1.7%.

Profits of state-owned enterprises increased 17.4% to $41.9 billion in 1988, and per-capita productivity was up 9.3%. Overall energy consumption continued to decline, and the estimated energy saving was equivalent to 30 million tons of coal. There were 9,024 state enterprises that adopted the management responsibility system in 1988, and their profits collectively increased 20.8%. To raise investment capital, some enterprises experimented with stock issuance, such as in the case of the iron and steel complex at Anshan, Liaoning.

The country's aggregate investment in fixed assets increased 10.5% to $116.3 billion in 1988 composed as follows: state-owned enterprises, $72.6 billion (up 17.3%); collectively owned enterprises, $16.7 billion (up 13.5%); and private, $300 billion (up 25.4%). The estimated cost of all projects under construction was $350.4 billion, which the Government considered an unwieldy constraint on the national budget. There were 14,400 projects, with an estimated cost of $11.9 billion, that were either canceled or postponed for the remaining years of the current plan period.

Capital investment in construction with public ownership increased 14.9% to $41.6 billion of which $10.0 billion was for energy, $5.6 billion was for raw materials, $5.9 billion was for transportation and telecommunications, and the remainder was for construction projects in agriculture, light industry, and other sectors. In 1988, $27.8 billion was invested in capital construction of production projects. Nonproduction projects were allotted $13.7 billion, which excludes the large increase invested in office buildings, exhibition halls, and hotels.

In 1988, an investment of $11.3 billion was utilized by 203 key projects designated by the state. A total of 78 medium- to large-size projects and 138 small, individual projects were completed and placed in operation during the year. Newly added production ca-

pacities included 9.99 million kilowatts of power generating capacity, 30.8 million tons of coal, 115 million barrels of crude oil, 4 million barrels of ethylene, 2.46 million tons of cement, 7.92 million standard boxes of plate glass, 419 kilometers of railway, 820 kilometers of double-track railway, 1,487 kilometers of electrified railway, and 8.78 million tons of port cargo handling. The technological transformation of state-owned enterprises continued to advance, absorbing $25.7 billion in modernizing equipment. Included in this investment was $10.1 billion to expand production capacity, $3.6 billion to increase product diversification and variety, $1.3 billion to upgrade and improve product quality and specifications, and $0.8 billion to reduce energy consumption. Nearly 40,000 projects, which were either re-equipped or transformed, were completed, representing an investment of $17.1 billion in fixed assets.

Both passenger and cargo transportation continued to be overstrained, encumbering the development of the national economy. Although China's transport performance improved, it was not commensurate with industrial growth. The income by the railroad sector increased 6.9% and its labor productivity by 5%. The year's container transport by railway and waterway totaled 16.51 million tons, an increase of 8%. The performance of China's transport services in billion units is shown in the text table.

	1987	1988
Cargo, tons per kilometer		
Railway	946.9	987.6
Highway	262.2	287.1
Waterway	950.8	996.4
Air	66	.74
Oil and gas pipeline	62.5	63.7
Total	**2,223.06**	**2,335.54**
Passenger, persons per kilometer		
Railway	284.2	326.0
Highway	218.9	238.2
Waterway	19.9	20.4
Air	18.6	21.4
Total	**541.6**	**606.0**
Cargo volume handled at major seaports, tons	396	436

Commodity sales during the year rose steadily. The total value of the country's retail sales increased 27.8% to $200.5 billion. Retail sales of agricultural goods were $24.2 billion and of consumer goods, $176.3 billion. Retail sales by state-owned enterprises increased by 29.9%; cooperative rose by 27.9%; and collective, joint, and individual ownership increased by 21.2%, 27.7%, and 30%, respectively.

Retail prices rose sharply, and the average price level was 18.5% higher than in 1987. The average price increase in urban areas was 21.3% compared to 17.1% in the rural areas. The increased prices were attributed to demand-pulled inflation, arbitrary price hikes, and black-marketing.

In 1988, total exports were valued at $47.54 billion and imports, at $55.25 billion, which represented a trade deficit of $7.71 billion. After allowing for invisible trade transactions, the deficit was reduced to $3.09 billion. Nontrade foreign exchange income was up 22% to $6.61 billion, an income of $3.91 billion after allowance for the trade deficit. China utilized $9.84 billion in foreign capital, an increase of 16.4%. Direct investments by foreign businesses amounted to $2.62 billion, up 13.1%, and the remainder was posted as guarantees.

The business income from overseas projects and labor service was $1.2 billion, a slight decrease compared to that of the previous year. New contracts signed by China for overseas projects totaled $1.83 billion in 1988, an increase of 10.6%.

Curiosity about the sometime phoenix continued to soar. China received 31.69 million tourists and visitors from 168 countries, an increase of 17.8% over that of the previous year. Foreign exchange earnings through tourism were $2.22 billion in 1988, up 19.2%.

The State National Science Foundation approved 2,983 scientific research projects and appropriated $30.5 million for research and development in basic and applied scientific investigation. By the end of 1988, the state had standardized 132 weights and measures, established 261 specifications for new products, and standardized state specifications for various products of which 38.5% met international specifications. A total of 11,500 patents were issued, an increase of 68.8%. The number of technological contracts signed amounted to over 247,000 and represented a business value of $1.9 billion.

A total of 26,000 topographic maps of various scales were drawn from surveys by several agencies, and 307 maps were published representing a total printing of 74.4 million copies. In 1988, 281 geological surveys were conducted in order to delineate mineral formation. Verified reserves of 55 minerals were increased, which included 9.3 billion tons of coal, 760 million tons of iron ore, and a nonspecified amount for gold. The Government actively continued to survey both onshore and offshore areas for oil and natural gas exploration.

Per capita income for urban workers was $301 and for the agricultural sector, $147. By the end of 1988, nationwide employment was 135,730,000 and the total annual income was $61.9 billion. The birthrate in China was 20.78 per 1,000 and the mortality rate, 6.58 per 1,000. By yearend, the population grew by 15,410,000 to 1,096,140,000.

Production

China had a rich and diverse minerals resource base, and its mining industry ranked high in the world in terms of output. China ranks first in world pro-

duction of barite, cement, coal, rare earths, and tungsten. It was the second largest producing country for magnesite, salt, and soda ash, and the third largest for beryllium, fluorspar, gypsum, iron ore, talc, and vanadium. Moreover, China was among the 10 leading producers of aluminum, bauxite, gold, ilmenite, iodine, lithium, manganese, mercury, nickel, petroleum, phosphate rock, steel, tin, titanium sponge, and zircon. The total value of China's mine output in 1988 was estimated at $30 billion, and the value of downstream processing and manufacturing was estimated at $250 billion.

Although China's production was of international significance, it had a very low per capita consumption of minerals and metals. The Government continued to give priority for investments to increase the production capacity for aluminum, cement, chemicals, and iron and steel in addition to fossil fuels. The overall output of heavy industry grew 16.4% in 1988, however, the growth in output of critical raw materials such as coal was only 5.4%; cement 12.2%; crude oil 2.1%; fertilizers 3.8%; and steel 7.0%;.

Production of minerals and metals in China was by a mix of Government and corporate identities. The major Government producing bodies were the Ministry of Metallurgical Industry for iron and steel, State Administration for Building Materials for cement, and the Ministry of Chemical Industry for fertilizers. The major corporate bodies for the production of minerals, metals, and fuels include China National Nonferrous Metals Industry Corp., China National Non-Metallic Minerals Industry Corp., and China National Offshore Oil Corp. In 1988, Government restructuring and organization continued and a new Ministry for Energy Resources was created from former ministries such as those for coal, and petroleum and natural gas. The new ministry was delegated to be in charge of planning and regulation as new corporate identities were created for the production of coal, petroleum and natural gas, and electric power generation. Since 1984, the Ministry of Geology and Minerals Resources has operated mines and production facilities, particularly those involving nonmetallic minerals. In addition to the large national entities, there were numerous provincial- and local-level companies and Government bodies involved with producing minerals, metals, and coal.

Trade

After nearly three decades of closed-door policy, China's acceptance into the international community can be measured by the growth in its total, external trade turnover. In the first year of the sixth 5-year plan (1981-85), China's trade turnover was $44,022 million. By the last year of the plan period, total trade reached $69,602 million. In the first year of the seventh 5-year plan, total trade was $73,846 million and reached $102,701 million in 1988. The expansion of China's trade in millions of dollars since 1981 was as shown in the text table:

Year	Exports	Imports	Trade Deficit (−) or Surplus (+)
1981	22,007	22,015	+8
1982	23,321	19,285	−4,036
1983	22,226	21,390	+836
1984	26,139	27,410	−1,271
1985	27,350	42,252	−14,902
1986	30,942	42,904	−11,962
1987	39,437	43,216	−3,779
1988	47,450	55,251	−7,711

In 1988, China's 10 largest trading partners were Xianggang and Aomen, which were commonly considered as transshipment points for Chinese shipments and receipts, followed by Japan, the United States, the Federal Republic of Germany, the U.S.S.R., Singapore, Italy, Canada, the United Kingdom, and France. China's trade with Xianggang and Aomen was $30,830 million, which accounted for 30% of its total trade. Exports to these ports increased by $4,500 million to $18,710 million in 1988, and imports increased by $3,570 million to $12,120 million. China's trade with Japan totaled $18,980 million, which accounted for 18.5% of its total trade. Exports to Japan were $7,920 million, up 23.8%, and imports were $11,060 million, an increase of 9.8%. The trade with the United States was valued at $10,010 million, or 9.7% of China's total trade turnover. China's exports to the United States were $3,380 million, an increase of 11.3%, and imports were up 37.3%, totaling $6,630 million.

The largest component of China's two-way trade was manufactures. The net import of manufactured goods was the largest contributor to China's trade deficit. The composition of China's trade in millions of dollars was as shown in the text table:

	1987	1988
Exports		
Primary products:		
Food and live animals, chiefly for food	4,781	5,891
Beverages and tobacco	175	236
Crude, inedible materials, except fuels	3,651	4,257
Mineral fuels and related materials	4,544	3,972
Animal and vegetable oils, fats, and waxes	81	74
Manufactures:		
Chemical and related products	2,235	2,897
Manufactured goods classified chiefly by material	8,570	10,431
Machinery and transport equipment	1,741	2,769
Miscellaneous manufactured articles	6,273	8,268
Commodities not elsewhere classified	7,387	8,681
Imports		
Primary products:		
Food and live animals, chiefly for food	2,443	3,476

	1987	1988
Primary products—continued		
Beverages and tobacco	263	346
Crude, inedible materials, except fuels	3,320	5,090
Mineral fuels and related materials	539	787
Animal and vegetable oils, fats, and waxes	349	369
Manufactures:		
Chemical and related products	5,008	9,139
Manufactured goods classified chiefly by material	9,730	10,410
Machinery and transport equipment	14,607	16,673
Miscellaneous manufactured articles	1,877	1,983
Commodities not elsewhere classified	5,078	6,979

The major trading organizations of China's trade in minerals and metals were China Metallurgical Import and Export Corp., China National Metals & Minerals Import and Export Corp., China National Coal Import and Export Corp., China National Chemicals Import and Export Corp., and China National Building Material & Equipment Import and Export Corp.

The data given in tables 2 and 3 bear the caveat that the numeric information is not a complete presentation of China's commodity trade. The information given is compiled from trade data only from publicly disseminated customs declarations by China's major partners.

Commodity Review

Metals.—China produced a wide array of metals and output was significant in the context of world production. The largest metal-producing sectors were iron and steel followed by aluminum, which were each targeted in capacity expansion programs under the economic plan. Another important sector was gold, which was important to the national economy for its conversion to obtain hard foreign currency, rather than for its industrial use or much less for ornamental and fashion objects. The output of antimony, mercury, rare earths, tungsten, and to a much lesser degree for tin, was largely export oriented and met domestic needs as well as foreign demand.

Aluminum.—In 1988, mine output of bauxite was about 4 million tons, of which 80% was metallurgical grade and the remainder for abrasive, chemical, and refractory uses. Consumption of aluminum metal exceeded 900,000 tons, and domestic metal production provided close to 90% of the supply and imports the remainder. When full production capacity is on-stream in 1990 from plant expansion and/or new construction in Guangxi, Hebei, Qinghai, and Shaanxi, the national annual output capacity was expected to reach close to 1.3 million tons. China's primary aluminum plants were as shown in the text table.

Location	1988 Capacity (thousand tons per year)	1990 Capacity (thousand tons per year)
Anhui		
Hefei	25	25
Gansu		
Baiyin	50	50
Lanzhou	30	30
Guangxi		
Pingguo	40	100
Guizhou		
Guiyang	110	110
Hebei		
Handan	—	100
Henan		
Jiaozuo	30	30
Sanmenxia	30	30
Hubei		
Wuhan	35	35
Hunan		
Changsa	15	15
Xinxiang	—	[1]250
Jilin		
Changchun	15	15
Liaoning		
Fushun	100	100
Nei Monggol		
Baotou	20	20
Ningxia		
Qingtongxia	100	100
Yinchuan	30	30
Qinghai		
Xining	100	200
Shaanxi		
Tongchuan	10	10
Xi'an	—	200
Shandong		
Qingdao	15	15
Zibo	80	80
Shanxi		
Taiyuan	25	25
Yunnan		
Kunming	15	15
Total	**875**	**1,335** [1]**1,585**

[1]1995.

Antimony.—China was a major world producer and exporter of antimony. The major antimony operations in China in descending order were in Hunan, Guangxi, Guizhou, and Gansu. Mine output at Xihuangshan, Hunan, accounted for the largest percentage of the country's total export of antimony, perhaps as much as 50%. China was a major world purveyor of antimony in 1988, exporting over 29,000 tons, valued at $62 million. Antimony shipments to the United States alone included 13,436 tons of metal ($29.1 million), 3,697 tons of oxide ($7.8 million), 104 tons of sulfide ($14,508), and 71 tons of other antimony compounds ($158,880).

Copper.—China's annual metal production capacity was 565,000 tons. Concentrate from domestic mine production was about 90% of smelter feed, and the remainder was from imported material. Domestic supply in 1988 was from refinery output, supple-

TABLE 1

CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1984	1985	1986	1987	1988
METALS						
Aluminum:						
Bauxite, gross weight		1,600,000	1,650,000	1,650,000	2,400,000	3,200,000
Alumina, gross weight		800,000	825,000	825,000	1,200,000	2,200,000
Metal, refined, primary		400,000	410,000	410,000	615,000	800,000
Antimony, mine output, Sb content		15,000	15,000	15,000	15,000	15,000
Bismuth, mine output, Bi content		260	260	260	260	275
Cadmium, smelter		'450	'540	'650	'680	700
Copper:						
Mine output, Cu content		180,000	185,000	185,000	'250,000	300,000
Metal:						
Smelter, primary and secondary		210,000	225,000	225,000	300,000	300,000
Refined, primary and secondary		310,000	400,000	400,000	400,000	400,000
Gold, mine output, Au content	thousand troy ounces	1,900	1,950	2,100	2,300	2,500
Iron and steel:						
Iron ore, gross weight	thousand tons	75,000	66,000	90,000	100,000	105,000
Pig iron	do.	39,980	43,600	50,200	53,900	56,400
Ferroalloys	do.	900	900	1,020	1,150	1,200
Steel, crude	do.	43,370	46,700	52,100	56,000	59,000
Steel, rolled	do.	33,710	36,900	40,500	43,900	47,000
Lead:						
Mine output, Pb content		180,000	200,000	227,000	'267,000	250,000
Metal, refined, primary and secondary		195,000	210,000	240,000	'246,000	240,000
Magnesium metal, primary		7,000	7,000	7,000	7,000	7,000
Manganese ore, gross weight	thousand tons	1,600	1,600	1,600	1,600	1,600
Mercury, mine output, Hg content	76-pound flasks	20,000	20,000	20,000	20,000	20,000
Molybdenum, mine output, Mo content		2,000	2,000	2,000	2,000	2,000
Nickel:						
Mine		14,000	25,000	25,000	25,000	25,000
Smelter		14,000	22,500	22,500	22,500	25,000
Silver, mine output, Ag content	thousand troy ounces	2,500	2,500	3,000	3,000	3,500
Tin:						
Mine output, Sn content		15,000	15,000	15,000	'20,000	25,000
Metal, smelter		15,000	15,000	15,000	'20,000	25,000
Tungsten, mine output, W content		13,500	15,000	15,000	18,000	20,000
Zinc:						
Mine output, Zn content		160,000	300,000	396,000	'458,000	360,000
Refined, primary and secondary		185,000	275,000	336,000	'383,000	340,000
INDUSTRIAL MINERALS						
Asbestos		160,000	160,000	150,000	150,000	150,000
Barite	thousand tons	1,000	1,000	1,000	'1,250	1,500
Cement, hydraulic	do.	121,080	142,500	161,600	180,000	203,000

See footnotes at end of table.

TABLE 1—Continued

CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1984	1985	1986	1987	1988
INDUSTRIAL MINERALS—Continued						
Fluorspar		r750,000	r850,000	r900,000	r1,000,000	1,100,000
Graphite		185,000	185,000	185,000	185,000	200,000
Gypsum	thousand tons	4,800	5,000	6,500	7,200	8,100
Kyanite and related materials		2,500	2,500	2,500	2,500	2,500
Lithium minerals, all types		15,000	15,000	15,000	15,000	15,000
Magnesite	thousand tons	2,000	2,000	2,000	2,000	2,000
Nitrogen: N content of ammonia	do.	14,000	15,000	15,500	r16,000	16,200
Phosphate rock and apatite, P_2O_5 equivalent	do.	3,200	1,900	1,800	2,700	2,700
Potash, marketable, K_2O equivalent	do.	40	40	40	40	40
Salt	do.	16,000	14,450	17,300	18,000	22,000
Sodium compounds: Sodium carbonate, natural and synthetic	do.	1,880	2,000	2,100	r2,400	2,600
Sulfur:						
Native	do.	200	200	300	300	300
Content of pyrite	do.	2,300	2,300	2,500	r3,700	3,900
Byproduct, all sources	do.	350	350	300	r500	550
Total	**do.**	**2,850**	**2,850**	**3,100**	**r4,500**	**4,750**
Talc and related materials		950,000	950,000	1,000,000	1,000,000	1,000,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	thousand tons	154,000	155,000	160,000	170,000	175,000
Bituminous and lignite	do.	618,000	695,400	710,000	750,000	770,000
Total	**do.**	**772,000**	**850,400**	**870,000**	**920,000**	**945,000**
Coke, all types	do.	35,000	39,000	41,400	45,000	47,000
Gas, natural:						
Gross	billion cubic feet	490	510	540	550	560
Marketed	do.	438	455	485	495	505
Petroleum:						
Crude (including crude from oil shale)	thousand 42-gallon barrels	836,069	873,500	953,500	978,200	999,200
Refinery products	do.	550,000	655,000	700,000	710,000	725,000

r Revised.

[1] Table includes data available through July 26, 1989.

[2] In addition to the commodities listed for which quantitative estimates of output have been made, China is known or believed to have produced other commodities for which no estimates have been prepared.

TABLE 2

CHINA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Destinations, 1987	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals	605	678	198	Japan 294; Philippines 75.
Aluminum:				
Ore and concentrate	600,219	559,408	309,126	Japan 59,907; Italy 30,892; Turkey 25,995.
Oxides and hydroxides	4,414	[2]5,185	265	Thailand 1,775; Pakistan 1,574; Hong Kong 848.
Metal including alloys:				
Scrap	249	3,136	(3)	Hong Kong 1,735; Japan 1,401.
Unwrought	523	54,548	1,206	Hong Kong 26,732; Japan 22,271.
Semimanufactures	5,149	10,562	48	Hong Kong 9,799; Japan 289.
Antimony:				
Ore and concentrate	2,295	3,200	1,966	Belgium-Luxembourg 956; Italy 126; Spain 84.
Oxides	5,044	4,392	3,088	Netherlands 796; United Kingdom 238; Spain 130.
Metal including alloys, all forms	10,402	7,576	6,244	Belgium-Luxembourg 713; United Kingdom 243.
Arsenic:				
Ore and concentrate	—	2	—	All to Spain.
Oxides and acids	155	763	233	Hong Kong 375; United Kingdom 136.
Metal including alloys, all forms	295	463	463	
Beryllium:				
Ore and concentrate	455	462	462	
Oxides and hydroxides	10	3	3	
Metal including alloys, all forms	10	—		
Bismuth: Metal including alloys, all forms	25	91	8	United Kingdom 72; Spain 8.
Cadmium: Metal including alloys, all forms	96	486	117	Belgium-Luxembourg 366.
Chromium:				
Oxides and hydroxides	1,843	1,239	342	Hong Kong 558; Japan 94.
Metal including alloys, all forms	903	1,091	791	Belgium-Luxembourg 153; United Kingdom 59.
Cobalt: Oxides and hydroxides	59	43	10	Hong Kong 14; Singapore 7.
Columbium and tantalum: Metal including alloys, all forms, tantalum kilograms	84	[4]5,000	5,000	
Copper:				
Matte including cement copper	—[4]	20	20	All to Pakistan.
Oxides	1	18	—	All to Hong Kong.
Sulfate	360	83	—	Do.
Metal including alloys:				
Scrap	2,053	7,027	—	Hong Kong 6,844; Japan 162.
Unwrought	283	8,833	173	Hong Kong 6,714; Japan 1,931.
Semimanufactures	9,892	22,583	461	Hong Kong 20,818; Pakistan 663.
Gold:				
Ore and concentrate value, thousands	NA	$1,257	—	All to Canada.
Metal including alloys, unwrought and partly wrought troy ounces	359,756	[5]340,829	NA	Hong Kong 340,829.

See footnotes at end of table.

TABLE 2—Continued

CHINA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Destinations, 1987	
			United States	Other (principal)
METALS—Continued				
Indium: Metal including alloys, all forms	8	—		
Iron and steel:				
Iron ore and concentrate excluding roasted pyrite	2,026	57,165	57,165	
Pyrite, roasted	—	50	—	All to Spain.
Metal:				
Scrap	2,899	111,693	508	Thailand 62,598; Hong Kong 35,433.
Pig iron, cast iron, related materials	5,733	318,695	—	Japan 268,415; Thailand 33,490.
Ferroalloys:				
Ferrochromium	134	—		
Ferromanganese	1,527	8,378	—	Pakistan 5,797; Japan 1,611; Singapore 500.
Ferromolybdenum	81	25	—	Netherlands 18; United Kingdom 5.
Ferrosilicon	—	38,045	—	Hong Kong 34,093; Belgium-Luxembourg 1,823.
Silicon metal	—	5,636	1,209	United Kingdom 2,425; Netherlands 1,463.
Unspecified	55,139	198,726	3,525	Japan 181,006; Pakistan 3,949.
Steel, primary forms	1,057	6,915	12	Thailand 6,124; Philippines 700.
Semimanufactures:				
Bars, rods, angles, shapes, sections	170,042	192,436	4,378	Hong Kong 173,616; Singapore 13,258.
Universals, plates, sheets	4,981	34,173	548	Hong Kong 15,262; Japan 7,868; Singapore 3,129.
Hoop and strip	6,907	10,198	—	Niger 7,253; Hong Kong 1,417.
Rails and accessories	1,929	48	—	All to Singapore.
Wire	53,393	61,626	6,848	Hong Kong 29,938; Singapore 10,458.
Tubes, pipes, fittings	46,032	72,149	14,327	Hong Kong 45,907; Singapore 4,771.
Castings and forgings, rough	4,983	2,736	16	Japan 1,387; United Kingdom 915.
Lead:				
Ore and concentrate	10,917	40,188	3,568	Japan 22,337; Italy 9,600; Belgium-Luxembourg 4,171.
Oxides	2,274	3,908	—	Japan 2,031; Algeria 875; Pakistan 508.
Metal including alloys:				
Scrap	167	117	—	Hong Kong 80; Pakistan 37.
Unwrought	925	18,756	547	Hong Kong 10,844; Japan 2,723.
Semimanufactures	45	148	—	Hong Kong 100; Singapore 44.
Lithium: Oxides and hydroxides	81	159	—	Spain 46; Italy 41; Netherlands 40.
Magnesium: Metal including alloys, all forms	—	126	—	Japan 114; Hong Kong 12.
Manganese:				
Ore and concentrate	4,330	6,584	—	Japan 5,897; Hong Kong 665.
Oxides	2,550	3,431	—	Hong Kong 1,875; Pakistan 591; Thailand 443.
Metal including alloys, all forms	322	1,549	—	Belgium-Luxembourg 531; United Kingdom 507; Netherlands 333.
Mercury: 76-pound flasks	13,223	27,672	11,777	Hong Kong 7,358; Pakistan 2,379.

See footnotes at end of table.

TABLE 2—Continued

CHINA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Destinations, 1987	
			United States	Other (principal)
METALS—Continued				
Molybdenum:				
Ore and concentrate	4,693	5,713	51	Belgium-Luxembourg 2,969; Netherlands 1,744.
Metal including alloys, all forms	72	77	44	Japan 17; Netherlands 10.
Nickel:				
Ore and concentrate	6	--		
Matte and speiss	1	—		
Oxides and hydroxides	18	5	—	All to Hong Kong.
Metal including alloys, all forms	2,247	9,090	3,066	Japan 5,075; Hong Kong 438.
Platinum-group metals: Metals including alloys, unwrought and partly wrought value, thousands	$5,689	$7,341	$1,477	United Kingdom $4,155; Hong Kong $1,402.
Rare-earth metals including alloys, all forms	89	31	7	Netherlands 22.
Selenium, elemental	—	3	—	All to United Kingdom.
Silicon, high-purity	—	133	—	Belgium-Luxembourg 86; Netherlands 47.
Silver:				
Ore and concentrate value, thousands	$636	$32	—	All to Thailand.
Waste and sweepings[6] do.	$756	$644	$425	United Kingdom $217.
Metal including alloys, unwrought and partly wrought do.	$8,022	$57	$20	Hong Kong $37.
Tin:				
Ore and concentrate	10,499	21,457	—	Singapore 10,788; Hong Kong 7,985.
Oxides	1,185	1,448	—	Japan 1,309; Thailand 139.
Metal including alloys:				
Scrap	27	109	99	Hong Kong 10.
Unwrought	7,633	17,359	8,680	Hong Kong 4,310; Japan 3,662.
Semimanufactures	330	366	2	Hong Kong 363.
Titanium:				
Oxides	4,183	7,412	1,119	Hong Kong 3,792; Netherlands 618.
Metal including alloys, all forms	67	262	81	United Kingdom 175; Italy 6.
Tungsten:				
Ore and concentrate	5,595	4,126	2,612	Hong Kong 1,082; Singapore 247.
Oxides and hydroxides	—	28	—	All to Belgium-Luxembourg.
Metal including alloys, all forms	144	288	178	Singapore 83; Netherlands 10.
Uranium and thorium:				
Oxides and other compounds	—	10	—	All to Hong Kong.
Metals including alloys, all forms value, thousands	$24	—		
Vanadium: Oxides and hydroxides	347	2,921	—	Belgium-Luxembourg 2,388; Netherlands 266.
Zinc:				
Ore and concentrate	99	14,973	(7)	Japan 10,505; Italy 4,468.
Oxides	3,775	3,814	—	Hong Kong 928; Japan 772; Algeria 395.
Blue powder	2	364	—	Spain 349; Philippines 10.
Metal including alloys, all forms	48,196	96,221	4,318	Hong Kong 61,335; Japan 13,295.

See footnotes at end of table.

TABLE 2—Continued

CHINA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Destinations, 1987	
			United States	Other (principal)
METALS—Continued				
Other:				
Ores and concentrates	29,176	14,909	—	Japan 7,314; Hong Kong 4,835; Austria 1,598.
Oxides and hydroxides	343	1,198	—	Philippines 1,079; Canada 119.
Ashes and residues	6,400	6,730	237	Hong Kong 5,816; Japan 586.
Base metals including alloys, all forms:				
Quantity, reported	9,285	15,129	—	Hong Kong 8,792; Japan 5,560; Brazil 421.
Value only, reported thousands	$425	$291	—	Canada $247; New Zealand $44.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	7,398	11,883	3	Hong Kong 10,306; Pakistan 460.
Artificial:				
Corundum	36,778	54,877	747	Japan 26,428; Hong Kong 25,717.
Silicon carbide	16,432	5,686	1,558	Hong Kong 4,000; United Kingdom 70.
Dust and powder of precious and semiprecious stones value, thousands	—	$386	$370	Singapore $16.
Grinding and polishing wheels and stones	6,910	5,973	330	Pakistan 2,066; Hong Kong 1,908.
Asbestos, crude	553	158	—	Thailand 54; Hong Kong 35; Singapore 33.
Barite and witherite	492,528	729,258	577,274	Netherlands 74,850; Japan 68,958.
Boron materials:				
Crude natural borates	25	11	1	Netherlands 10.
Oxides and acids	2,274	1,536	—	Hong Kong 593; Pakistan 244; Netherlands 230.
Cement	160,079	154,453	—	Hong Kong 153,918; Japan 270.
Chalk	75	13	—	All to Pakistan.
Clays, crude	255,521	342,817	3,002	Hong Kong 188,507; Japan 134,667.
Cryolite and chiolite	51	1,055	1,055	
Diamond:				
Gem, not set or strung value, thousands	$19,619	$16,233	$315	Belgium-Luxembourg $9,431; Hong Kong $4,682.
Industrial stones do.	$3,771	$1,782	$21	Belgium-Luxembourg $931; Hong Kong $813.
Diatomite and other infusorial earth	239	127	—	Japan 97; Thailand 20.
Feldspar, fluorspar, related materials	90,382	509,024	38,377	Japan 390,195; Hong Kong 69,976.
Fertilizer materials:				
Crude, n.e.s.	106	994	1	Hong Kong 822; Singapore 141.
Manufactured:				
Ammonia	2,060	2,442	—	Hong Kong 2,395; Thailand 45.
Nitrogenous	4,909	3,537	244	Hong Kong 2,817; Japan 391.
Phosphatic	42,357	61,195	—	Japan 58,346; Hong Kong 1,560; Singapore 942.
Potassic	—	7,249	6,798	Niger 434; Japan 17.
Unspecified and mixed	3,769	4,910	100	Japan 2,312; Niger 1,882.
Graphite, natural	81,290	68,631	10,582	Japan 34,646; United Kingdom 8,656.
Gypsum and plaster	4,421	219,155	211,594	Hong Kong 3,539; Japan 3,103.
Kyanite and related materials	20	216	—	United Kingdom 116; Italy 100.

See footnotes at end of table.

TABLE 2--Continued

CHINA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Destinations, 1987	
			United States	Other (principal)
INDUSTRIAL MINERALS--Continued				
Lime	44,150	44,264	—	Hong Kong 43,865; Singapore 399.
Magnesium compounds: Crude including calcined	524,567	[e]197,318	55,061	Netherlands 26,414; Hong Kong 27,201.
Mica:				
Crude including splittings and waste	3,039	[e]16,258	—	United Kingdom 10,045; Japan 5,972.
Worked including agglomerated splittings	60	85	—	Hong Kong 79.
Nitrates, crude	20	1,149	—	All to Hong Kong.
Phosphates, crude	1,610	10,274	—	Japan 6,661; Philippines 3,213; Hong Kong 350.
Phosphorus, elemental	—	154	30	Belgium-Luxembourg 124.
Pigments, mineral:				
Natural, crude	932	564	—	Hong Kong 514; Philippines 50.
Iron oxides and hydroxides, processed	8,708	12,781	110	Hong Kong 3,166; Egypt 2,852; Pakistan 2,541.
Precious and semiprecious stones other than diamond:				
Natural value, thousands	$4,822	$8,828	$599	Hong Kong $7,196; Japan $913.
Synthetic do.	$335	$167	$7	Hong Kong $96; Singapore $50.
Pyrite, unroasted	7,531	134,428	—	All to Japan.
Salt and brine	176,428	747,291	—	Japan 579,379; Hong Kong 118,469; Philippines 31,629.
Sodium compounds, n.e.s.:				
Carbonate, natural and manufactured	5,677	3,906	—	Hong Kong 3,365; Jordan 310; Singapore 200.
Sulfate, natural and manufactured[10]	102,008	94,074	—	Hong Kong 76,708; Philippines 11,557; Singapore 4,440.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	153,773	186,737	525	Japan 167,646; Hong Kong 13,886.
Worked	38,802	91,226	7,523	Japan 65,280; Hong Kong 8,425.
Dolomite, chiefly refractory-grade	—	9,823	—	Japan 9,313; Singapore 308.
Gravel and crushed rock	4,593,547	6,465,927	25	Hong Kong 6,461,037; Japan 3,568.
Limestone other than dimension	38,125	32,119	—	Hong Kong 32,118.
Quartz and quartzite	8,250	13,411	388	Japan 10,208; Hong Kong 2,493.
Sand other than metal-bearing	1,270,873	1,304,078	—	Hong Kong 1,258,658.
Sulfur:				
Elemental:				
Crude including native and byproduct	42,338	19,716	—	Thailand 13,798; Pakistan 2,351; Portugal 1,506.
Colloidal, precipitated, sublimed	3,801	669	—	Pakistan 417; Philippines 98; Hong Kong 76.
Sulfuric acid	6,473	7,332	(11)	Hong Kong 7,324; Pakistan 6.
Talc, steatite, soapstone, pyrophyllite	565,555	515,564	3,135	Japan 457,078; Hong Kong 29,404.
Vermiculite	5	3	—	All to Netherlands.
Other:				
Crude	35,966	63,056	330	Japan 39,703; Pakistan 7,477; Netherlands 4,121.
Slag and dross, not metal-bearing	8,935	7,667	—	Japan 7,010; United Kingdom 391.
Metalloids, unspecified[12]	2,511	19,698	—	Hong Kong 19,497; Netherlands 151.

See footnotes at end of table.

TABLE 2—Continued

CHINA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987[p]	Destinations, 1987	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		523	20,196	—	All to Japan.
Carbon:					
Carbon black		3,469	3,284	—	Hong Kong 1,455; Thailand 690; Singapore 537.
Gas carbon		--	17	—	All to Italy.
Coal:					
Anthracite and bituminous	thousand tons	5,543	7,540	—	Japan 4,301; Hong Kong 1,963; Italy 308.
Lignite including briquets		1,040	10,992	—	Philippines 9,995; Japan 997.
Coke and semicoke		25,944	41,210	—	Japan 24,268; Thailand 14,162; Hong Kong 2,520.
Peat including briquets and litter		100	308	7	Japan 301.
Petroleum:					
Crude	thousand 42-gallon barrels	187,866	174,204	20,390	Japan 89,228; Singapore 34,553; Brazil 18,583.
Refinery products:					
Liquefied petroleum gas	do.	109	10	—	Mainly to Thailand.
Gasoline	do.	18,976	18,027	5,891	Japan 10,692; Singapore 1,084.
Naphtha including white spirit	do.	1,938	24	—	All to Hong Kong.
Mineral jelly and wax	do.	721	675	58	Hong Kong 223; Singapore 121.
Kerosene and jet fuel	do.	2,923	3,620	([11])	Japan 2,227; Hong Kong 1,393.
Distillate fuel oil	do.	12,352	[13]8,161	—	Hong Kong 3,990; Singapore 2,042; Japan 1,598.
Lubricants	do.	1,057	[14]1,176	404	Thailand 357; Hong Kong 224.
Residual fuel oil	do.	3,783	[15]5,368	142	Japan 3,364; Hong Kong 1,449.
Asphalt	do.	—	1	—	All to Niger.
Bitumen and other residues	do.	16	18	—	Hong Kong 10; Japan 8.
Petroleum coke	do.	773	352	—	Mainly to Japan.
Unspecified	do.	56	—		

[p] Preliminary. — NA Not available.

[1] Table prepared by Audrey D. Wilkes. Owing to a lack of official trade data published by China, this table should not be taken as a complete presentation of this country's mineral exports. These data have been compiled from United Nations information and data published by the trading partner countries.

[2] Excludes unreported quantity imported by Japan valued at $443,000.

[3] Excludes unreported quantity valued at $6,000.

[4] Excludes unreported quantity imported by Japan valued at $1,000.

[5] Excludes unreported quantities imported by Italy and United States valued at $145,000 and $75,000, respectively.

[6] May include platinum-group metals.

[7] Unreported quantity imported by United States valued at $66,000.

[8] Excludes unreported quantity valued at $33,647,000.

[9] Excludes unreported quantity imported by New Zealand valued at $51,000.

[10] Includes hydrogen sulfate and pyrosulfate.

[11] Less than 1/2 unit.

[12] Reported under SITC item number as "selenium, tellurium, phosphorus, arsenic, etc."

[13] Excludes unreported quantity imported by New Zealand valued at $5,110,000.

[14] Excludes unreported quantity imported by Japan valued at $568,000.

[15] Excludes unreported quantity imported by Pakistan valued at $533,000.

TABLE 3

CHINA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Sources, 1987	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:	1	344	—	Japan 286; Hong Kong 58.
Aluminum:				
Ore and concentrate	—	3,657	—	All from Ireland.
Oxides and hydroxides	107,787	15,732	22	Singapore 11,010; Japan 4,470.
Metal including alloys:				
Scrap	1,141	1,637	212	Hong Kong 1,425.
Unwrought	94,519	33,681	79	Australia 17,269; New Zealand 6,802.
Semimanufactures	44,311	47,456	1,439	Hong Kong 20,066; Japan 12,939; Belgium-Luxembourg 3,397.
Arsenic: Oxides and acids	216	—		
Beryllium: Metal including alloys, all forms, value, thousands	—	$5	$5	
Bismuth: Metal including alloys, all forms	34	—		
Chromium:				
Ore and concentrate	145,573	13,498	—	Turkey 10,500; Ireland 2,99d.
Oxides and hydroxides	287	3,924	556	Japan 1,964; Hong Kong 1,401.
Metal including alloys, all forms	—	3	—	All from United Kingdom.
Cobalt: Oxides and hydroxides, kilograms	25	3,000	—	Netherlands 2,000; Japan 1,000.
Columbium and tantalum: Metal including alloys, all forms, tantalum, value, thousands	$594	$393	$16	Japan $377.
Copper:				
Ore and concentrate	125,980	55,950	2,470	Philippines 27,608; Canada 25,861.
Matte and speiss including cement copper	—	8,907	—	Chile 8,900.
Oxides and hydroxides	147	219	—	All from Hong Kong.
Sulfate	2,016	64	—	Do.
Metal including alloys:				
Scrap	31,773	7,972	370	Hong Kong 7,602.
Unwrought	50,539	5,336	—	Canada 3,995; Belgium-Luxembourg 922.
Semimanufactures	34,547	37,375	225	Chile 18,200; Hong Kong 10,680; Japan 7,946.
Gold:				
Ore and concentrate, value, thousands	$3,328	$2,310	—	All from Philippines.
Metal including alloys, unwrought and partly wrought, troy ounces	616	83,151	—	All from Hong Kong.
Iron and steel:				
Iron ore and concentrate including roasted pyrite	8,734,496	7,892,928	—	All from Australia.
Metal:				
Scrap	649,371	431,508	227,591	Japan 138,079; Canada 41,013.
Pig iron, cast iron, related materials	815,169	526,708	18	Brazil 428,214; Pakistan 52,500; Turkey 45,327.
Ferroalloys:				
Ferromanganese	720	—		
Unspecified	31	93	54	Austria 33; Hong Kong 5.

See footnotes at end of table.

TABLE 3—Continued

CHINA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987[p]	Sources, 1987	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued					
Metal—Continued					
Steel, primary forms		898,808	914,864	—	Japan 434,308; Brazil 360,638; Australia 55,051.
Semimanufactures:					
Bars, rods, angles, shapes, sections	thousand tons	6,052	2,173	(2)	Japan 1,167; Spain 227; Turkey 190.
Universals, plates, sheets	do.	4,096	3,415	11	Japan 3,013; Hong Kong 175.
Hoop and strip	do.	206	201	(2)	Japan 162; Hong Kong 23; Turkey 11.
Rails and accessories	do.	128	96	(3)	Japan 67; Australia 21.
Wire	do.	87	4 27	(2)	Hong Kong 18; Spain 6.
Tubes, pipes, fittings	do.	1,676	794	1	Japan 630; Argentina 89; Hong Kong 32.
Castings and forgings, rough	do.	2	1	(2)	Mainly from Belgium-Luxembourg and Austria.
Lead:					
Oxides		30	6	—	All from Japan.
Metal including alloys:					
Scrap		1,101	1,479	—	All from Hong Kong.
Unwrought		4,214	4,048	—	Hong Kong 2,994; Canada 499; Australia 294.
Semimanufactures		73	97	—	Hong Kong 73; Japan 24.
Magnesium: Metal including alloys, all forms		4,079	2,446	2,327	Hong Kong 56; Japan 41.
Manganese: Oxides		56	110	(5)	All from Hong Kong.
Mercury	76-pound flasks	—	90	—	Do.
Molybdenum:					
Ore and concentrate		—	15	—	All from Netherlands.
Metal including alloys, all forms		1	3	—	All from Japan.
Nickel:					
Matte and speiss		—	3	—	Do.
Metal including alloys, all forms		238	1,064	9	Hong Kong 751; Canada 196.
Platinum-group metals: Metals including alloys, unwrought and partly wrought	value, thousands	$4,715	$14,175	$6,462	Hong Kong $3,967; United Kingdom $3,733.
Selenium, elemental		15	10	—	United Kingdom 7; Netherlands 3.
Silver:					
Ore and concentrate	value, thousands	$6,018	$2,628	$133	Canada $2,495.
Waste and sweepings	do.	$8	$51	$37	Hong Kong $14.
Metal including alloys, unwrought and partly wrought	do.	—	$3,451	—	Hong Kong $1,973; Japan $1,297; United Kingdom $159.
Tin:					
Ore and concentrate		199	—		
Oxides	kilograms	—	20	—	All from Hong Kong.
Metal including alloys, all forms		855	364	2	Hong Kong 346; Japan 13.

See footnotes at end of table.

TABLE 3—Continued

CHINA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Sources, 1987	
			United States	Other (principal)
METALS—Continued				
Titanium:				
Oxides	8,448	8,761	2,321	Japan 4,770; Hong Kong 1,545.
Metal including alloys, all forms	399	11	—	Italy 10; United Kingdom 1.
Tungsten: Metal including alloys, all forms	6	25	(6)	Japan 23.
Uranium and thorium:				
Ore and concentrate	1	500	—	All from Singapore.
Oxides and other compounds kilograms	2,000	100	—	All from Hong Kong.
Zinc:				
Ore and concentrate	2,281	—		
Oxides	504	84	—	Hong Kong 67; Japan 12.
Blue powder	51	176	—	Hong Kong 154; Denmark 22.
Metal including alloys:				
Scrap	33	182	73	Hong Kong 109.
Unwrought	50,717	55,173	—	Hong Kong 12,894; Japan 12,294; Canada 10,482.
Semimanufactures	203	707	—	Canada 577; Hong Kong 111.
Zirconium: Ore and concentrate	—	150	—	All from United Kingdom.
Other:				
Ores and concentrates	12,979	1,943	—	Australia 1,715; Hong Kong 200.
Oxides and hydroxides	—	4	—	All from Philippines.
Ashes and residues	485	2,445	—	Canada 1,504; Hong Kong 913.
Base metals including alloys, all forms	885	4,030	313	Hong Kong 3,533; Japan 170.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	668	3,110	50	Hong Kong 3,051.
Artificial:				
Corundum	202	1,237	—	Japan 880; Hong Kong 335.
Silicon carbide	30	19	1	Hong Kong 18.
Dust and powder of precious and semiprecious stones including diamond value, thousands	$20	$106	$84	Japan $21.
Grinding and polishing wheels and stones	717	801	6	Hong Kong 622; Japan 93; Italy 65.
Asbestos, crude	254	411	—	Canada 299; Italy 72; Hong Kong 36.
Barite and witherite	25	602	601	Australia 1.
Boron materials:				
Crude natural borates	—	144	—	All from Japan.
Oxides and acids	3	11,749	2,115	Hong Kong 9,334; Turkey 300.
Cement	1,234,365	480,634	—	Hong Kong 473,841; Singapore 3,766; Japan 3,003.

See footnotes at end of table.

TABLE 3—Continued

CHINA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987[p]	Sources, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Chalk		—	1	—	All from Switzerland.
Clays, crude		3,755	3,892	1,947	Hong Kong 1,288; Japan 387.
Diamond:					
Gem, not set or strung	value, thousands	$10,915	$22,549	$133	Belgium-Luxembourg $18,334; Hong Kong $2,563.
Industrial stones	do.	$10,257	$9,129	$891	Belgium-Luxembourg $4,832; Netherlands $2,429.
Diatomite and other infusorial earth		953	2,190	944	Hong Kong 608; Japan 549.
Feldspar, fluorspar, related materials		5,340	1,750	206	Hong Kong 1,544.
Fertilizer materials:					
Crude, n.e.s.		301	132	—	Hong Kong 130; Australia 2.
Manufactured:					
Ammonia		47	93	—	Hong Kong 90.
Nitrogenous	thousand tons	1,534	608	—	Indonesia 313; Canada 159; Turkey 61.
Phosphatic	do.	587	258	—	Philippines 163; Tunisia 96.
Potassic	do.	347	865	—	Canada 794; Spain 68.
Unspecified and mixed	do.	268	506	—	Philippines 158; Italy 92; Greece 80.
Graphite, natural		10	30	—	Hong Kong 29; Italy 1.
Gypsum and plaster		567	806	—	Hong Kong 775; Japan 31.
Iodine including bromine and fluorine		170	2	—	All from Hong Kong.
Kyanite and related materials		4	—		
Lime		132	256	—	Hong Kong 226; Australia 20.
Magnesium compounds: Crude including calcined		285	[8]11,247	—	Ireland 11,137; Hong Kong 110.
Mica:					
Crude including splittings and waste		—	4	—	All from Hong Kong.
Worked including agglomerated splittings		70	[9]209	—	Do.
Phosphates, crude		267,640	48,649	—	Algeria 48,609; Singapore 40.
Pigments, mineral:					
Natural, crude		18	37	—	All from Hong Kong.
Iron oxides and hydroxides, processed		923	1,440	88	Hong Kong 1,204; Japan 124.
Potassium salts, crude		188,302	301,500	—	All from Jordan.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$12,082	$13,132	$11	Hong Kong $13,111.
Synthetic	do.	$219	$1,694	—	Australia $1,375; Canada $131.
Salt and brine		23,945	282	—	Hong Kong 248.
Sodium compounds, n.e.s.:					
Carbonate, natural and manufactured		773,315	452,331	282,759	Hong Kong 100,075; Japan 55,497.
Sulfate, natural and manufactured		141	1,595	—	All from Hong Kong.

See footnotes at end of table.

TABLE 3—Continued

CHINA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987[p]	Sources, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		50,704	811	—	Hong Kong 595; Ireland 101; Portugal 91.
Worked		10,292	14,475	130	Hong Kong 13,125; Italy 911.
Dolomite, chiefly refractory-grade		43	119	—	United Kingdom 65; Hong Kong 54.
Gravel and crushed rock		967	934	—	Hong Kong 928.
Limestone other than dimension		1,261	2,355	—	Hong Kong 2,341; Japan 14.
Quartz and quartzite		79	34	—	Hong Kong 30; Italy 4.
Sand other than metal-bearing		275	333	—	Hong Kong 275; Japan 40.
Sulfur:					
Elemental:					
Crude including native and byproduct		332	59	59	
Colloidal, precipitated, sublimed		9	12	—	All from Hong Kong.
Sulfuric acid		104	34,893	429	Japan 34,323; Hong Kong 138.
Talc, steatite, soapstone, pyrophyllite		678	1,130	396	Hong Kong 659; Italy 58.
Other:					
Crude		364	377	31	Hong Kong 256; Singapore 40.
Slag and dross, not metal-bearing		67	[10]712	—	All from Hong Kong.
Metalloids, unspecified[11]		NA	546	—	Do.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		21	3,004	—	Singapore 3,001.
Carbon:					
Carbon black		2,935	2,122	137	Australia 1,578; Hong Kong 194.
Gas carbon		—	46	—	All from United Kingdom.
Coal:					
Anthracite and bituminous		473,660	254,452	—	Australia 247,450; Ireland 7,000.
Lignite including briquets		139	—		
Coke and semicoke		—	5	—	All from Hong Kong.
Peat including briquets and litter		285	—		
Petroleum:					
Crude	42-gallon barrels	221,934	—		
Refinery products:					
Liquefied petroleum gas	do.	45,228	76,503	93	Hong Kong 67,106; Philippines 9,280.
Gasoline	do.	44,732	129,677	102	Singapore 83,011; Hong Kong 37,000.
Mineral jelly and wax	do.	5,579	11,435	110	Hong Kong 11,262.
Kerosene and jet fuel	do.	22,069	40,170	—	Hong Kong 40,000; Singapore 170.
Distillate fuel oil	do.	10,540,585	9,548,121	—	Singapore 7,706,563; Hong Kong 1,806,946.
Lubricants	do.	217,968	326,921	4,263	Hong Kong 266,533; Singapore 16,436.

See footnotes at end of table.

TABLE 3—Continued

CHINA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987[p]	Sources, 1987	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Petroleum—Continued					
Refinery products—Continued					
Residual fuel oil	42-gallon barrels	4,044,305	1,592,401	294,692	Hong Kong 874,232; Singapore 362,504
Bitumen and other residues	do.	7,926	28,720	—	Singapore 27,270; Hong Kong 1,402
Bituminous mixtures	do.	352	154	—	Hong Kong 75; Italy 67
Petroleum coke	do.	—	172,012	144,292	Japan 27,720

[p] Preliminary. NA Not available.
[1] Table prepared by Audrey D. Wilkes. Owing to a lack of official trade data published by China, this table should not be taken as a complete presentation of this country's mineral imports. These data have been compiled from United Nations information and data published by the trading partner countries.
[2] Less than 1/2 unit.
[3] Unreported quantity valued at $2,000.
[4] Excludes unreported quantity exported by Japan valued at $24,112,000.
[5] Unreported quantity valued at $7,000.
[6] Unreported quantity valued at $8,000.
[7] Excludes unreported quantities exported by Canada and the United Kingdom valued at $85,000 and $1,000, respectively.
[8] Excludes unreported quantity exported by Japan valued at $470,000.
[9] Excludes unreported quantity exported by Japan valued at $8,000.
[10] Excludes unreported quantity exported by Canada valued at $210,000.
[11] Reported under SITC item number as "selenium, tellurium, phosphorus, arsenic, etc."

mented with imports of 84,000 tons and secondary recovery of perhaps as much as 100,000 tons. The Government's emphasis was on the expansion of the aluminum sector rather than copper. Aluminum electrical cables presumably were to supplement copper cables made available to the energy sector. By 1990, copper refinery capacity was to reach 665,000 tons compared to 1.3 million tons for aluminum.

China's copper producers were as shown in the text table.

	1988 Capacity (thousand tons per year)
Anhui:	
Tongling No. 1	30
Tongling No. 2	30
Gansu:	
Baiyin	110
Hezheng Xian	35
Wu Wei	35
Henan, Zhuzhou	10
Hubei, Daye	30
Jiangxi, Guixi	90
Liaoning, Shenyang	50
Shanghai	65
Shanxi, Taiyuan	35
Tianjin	[1] 100
Yunnan, Kunming	45
Total	**565** **[1] 665**

[1] 1990.

Gold.—While gold output increased 14% in 1986, the annual increases in 1987 and 1988 were only about 10% each year, thereby falling short of the state target of 15% annual growth. Since 1978, the Government has permitted small-scale gold mining by individuals and collectives. However, by 1988, the Government began to restrict small-scale operations as a result of land-use conflicts and despoiling of the environment. In addition, because of the lower prices the state paid for gold, there apparently was a marked increase in gold smuggled out of the country. The estimated gold output in 1988 was as follows:

	Thousand ounces
Shandong	665
Heilongjiang	200
Henan	145
Hebei	90
Jilin	90
Liaoning	90
Nei Monggol	90
Shanxi	25
Other areas	30
Individuals and collectives	1,400
Byproduct of refinery operations	75
Total	**2,900**

Iron and Steel.—During 1981–85, the average annual increase in steel production was 2 million tons to reach a crude steel output of 46.7 million tons in the last year of the plan period. During 1986–90, the average annual increase in production was targeted at about 3 million tons in order to produce more than 60 million tons in 1990. Notably, crude steel output was already 59.2 million tons by 1988. To reach the targeted output in 1995 of 80 million tons, the average annual output would require an annual increase of 4 million tons.

Between 1986–95, the known proposed expansion program and new capacity to be installed was 21.1 million tons, reaching close to 72 million tons for the country's overall annual capacity. The 1988 capacity and the proposed capacity for the following steel facilities were as shown in the text table.

Steel facility	Capacity 1988 (metric tons)	Proposed capacity (metric tons)
Anhui, Ma'anshan	2,300,000	3,200,000
Fujian, Meizhouwan	—	300,000
Guangdong:		
Guangzhou	—	300,000
Shenzhen	—	3,900,000
Guangxi, Beihai	—	300,000
Hainan, Haikou	—	1,000,000
Hebei, Xuanhua	600,000	1,050,000
Hubei, Wuhan	4,000,000	7,000,000
Jiangsu:		
Meishan	—	2,000,000
Liaoning:		
Anshan	7,000,000	10,000,000
Benxi	1,600,000	3,600,000
Shandong:		
Laiwu	160,000	800,000
Shijiusuo	—	3,000,000
Shanghai, Baoshan	3,700,000	6,700,000
Sichuan, Panzhihua	1,700,000	2,500,000
Zhejiang, Ningbo	—	3,000,000
Total	**21,060,000**	**44,650,000**

Because of the capital cost required for new construction, the projects proposed for Beihai, Guangzhou, Haikou, Meizhouwan, Ningbo, Shenzhen, and Shijiusuo, will probably be delayed.

The Government's projected low demand for steel in 1995 was 136.6 million tons, a short fall in production of 64.7 million. The crude steel consumption and forecast, in metric tons, were as shown in the text table.

	Consumption	Forecast		
		Low	Midrange	High
1950	1,036,800	—	—	—
1955	3,915,900	—	—	—
1960	16,039,900	—	—	—
1965	7,983,000	—	—	—
1970	18,793,500	—	—	—
1975	25,365,600	—	—	—
1980	40,663,900	—	—	—
1985	72,235,100	—	—	—
1986	75,165,800	—	—	—
1990	—	96,012,000	99,815,000	103,619,000
1995	—	136,581,000	141,132,200	145,683,000
2000	—	193,860,000	199,624,300	205,388,000

Either the growth forecasted for steel demand was too optimistic or the imbalance between production and demand was to be made from purchases of foreign steel.

To ensure a steady supply of high-grade iron ore for the expanding steel industry, China Metallurgical Import and Export Corp. (CMIEC) and Hamersley Iron Pty. Ltd. of Australia signed an agreement to develop jointly the Channar iron ore mine in the Pilbara region of Western Australia. China's equity interest in the joint venture was represented by a wholly owned subsidiary, CMIEC Channar Pty. Ltd. (40%), whereas its counterpart in Australia was Channar Mining Pty. Ltd. (60%). All of the iron ore produced at Channar was to be shipped to China, and the share owned by Hamersley was to be sold to China on a long-term contract basis. Mine construction began in early 1988, and mine production was due to start in 1990 at a rate of 3 million tons per year and increase progressively in annual increments to 10 million tons per year. The total capital expenditure of the project was $250 million. The cost for the use of Hamersley's existing facilities was to be charged to the joint venture on a tolling or service fee basis.

The configuration of China's scrap recovery was expected to change in the next century. As soon as the industry modernizes and gains up-to-date technology, home scrap generation in finishing was to diminish. When the domestic economy expands, there should be increased production and consumption of consumer durable goods and attendant growth in waste disposal and the collection of old scrap such as that from vehicular stock. Ferrous scrap recovery in 1988 was 6.9 million tons, an increase of 8% over that of the previous year. Moreover, China was to compete more aggressively in world shipbreaking activities. Because of lower labor cost, China could become the world's second largest shipbreaking nation attaining a deadweight breakage capacity of 5 million tons per year in the 1990's.

During the seventh 5-year plan, China

was to invest $11 billion in technical renovation and capital construction in the iron and steel industry to ensure a steel production target of 60 million tons in 1990 and 95 million tons in the year 2000. In addition to the domestic funding, foreign capital would be sought to upgrade the existing facilities at the Anshan Iron and Steel Complex in Liaoning and the Wuhan Iron and Steel Corp. in Hubei.

China's largest iron and steel works at Anshan had an annual production capacity of 7.5 million tons of steel and 6.6 million tons of pig iron. It produced 7.2 million tons of steel in 1988. Imported advanced technology was being sought to modernize the complex and to increase its capacity to 15 million tons of steel per year.

The second largest steel producer, Wuhan Iron and Steel Corp., produced 4.3 million tons of steel in 1988. A total investment of $1.9 billion was earmarked for this project whereby annual production capacity would be increased to 7 million tons in 1993. Of this investment $590 million would be available from state sources, the rest would be obtained from foreign investment.

The Baoshan Iron and Steel Complex in Shanghai turned out 2.5 million tons of steel in 1986, quadrupling the output of the previous year. In November 1985, the first phase of construction went into operation using imported technology and equipment from Japan and the Federal Republic of Germany at a cost of $2.5 billion. The second phase, which would have a new blast furnace to be designed and built by the Chinese, was expected to be completed by June 1991. At the completion of the second stage construction, annual output capacity would be more than 6.7 million tons of steel.

The future emphasis of China's iron and steel industry is to be placed upon quality, variety, and technological advancement, rather than upon quantity, in order to ensure sustained development in the coming years. Quality improvement of iron and steel products to meet the world standards is the main task of the industry. It was expected that 40% of the products manufactured by the domestic major steelmakers would match international standards by the end of 1990. China must import up to 20 million tons of steel a year, at a cost of $5 billion of mostly high-quality products in order to meet the huge domestic demand.

Lacking sufficient domestic funds, the Chinese must use foreign funds to boost the iron and steel industry. To absorb foreign investment, China plans to negotiate with Japan and the countries of western Europe to build or expand its existing iron and steel plants. Four major steel plants to use foreign capital were Laiwu, Shandong; Wuhan, Hubei; Meishan, Jiangsu; and Anshan and Benxi, Liaoning. The Wuhan project had an estimated cost of $2.2 billion. The Anshan Iron and Steel Works were expected to spend $849 million on technical renovations. The first phases of these projects were expected to be completed by 1993, and increased production would begin in 1995. In the first half of 1987, financing for the expansion and reconstruction to 3 million tons per year at a total cost of $810 million at the Panzhihua Iron and Steel Co. was completed by raising $210 million from 24 foreign banks. China's own investment funds would be raised by local governments and individual factories through issuing bonds. Seven key iron and steel companies planning to do so were Baoshan, Baotou, Benxi, Panzhihua, Shoudu, Tangshan, and Wuhan.

Lead and Zinc.—Although China was a net exporter of zinc metal in 1986 and 1987, it was a net importer of zinc in 1988. Trade of lead was not separately reported. China may possibly receive lead and zinc metal in barter or countertrade for Daqing crude oil, which was transported to North Korea by pipeline for refining at Anju. China's consumption of lead and zinc in 1988 was probably 250,000 tons and 400,000 tons, respectively. The capacities, in thousand metric tons, for China's smelter facilities at yearend 1988 were as shown in the text table.

	Lead	Zinc
Fujian		
Liancheng	10	15
Gansu		
Baiyan	50	100
Guangdong		
Shaoguan	15	30
Guangxi		
Changpo	5	20
Hunan		
Songbai	10	5
Zhuzhou	50	135
Liaoning		
Huludao	—	60
Shenyang	50	20
Shanghai	5	—
Yunnan		
Lanping	20	40
Unspecified	50	100
Total	**265**	**425**

Rare Earths.—China had purportedly the world's largest resources of rare earths, and reserves were equivalent to four times those in the rest of the world. The largest occurrence of rare earths was associated with the magnetite deposit at Bayan Obo, Nei Monggol. The ore was reduced to pig iron at Baotou, and the slag was treated for byproduct rare-earth recovery. Baotou was China's largest producer and accounted for 80% of its rare earths output. China exports high-purity rare earths and yttrium compounds, most notably to Japan. China was believed to equal or to exceed U.S. production of rare earths in 1988.

Tin.—China had rich tin resources, and its reserves may have accounted for as much as 20% of the total world resources. Although China was a major tin producer, it played a minor role in world commerce. Exports of tin decreased from 15,894 tons in 1987 to

10,717 tons, valued at $71.04 million, in 1988. Close to 60% of China's export of tin metal in 1988 was to the United States.

Tin production in Guangxi and Yunnan accounted for about 80% of the national output. China's tin smelter capacity in 1988 was estimated as shown in the text table.

	Metric tons
Guangzhou, Guangdong	1,000
Dachang, Guangxi	5,000
Hengyang, Hunan	500
Ganzhou, Jiangxi	500
Gejiu, Yunnan	15,000
Undistributed	5,000
Total	**30,000**

Titanium.—China had abundant titanium resources with large quantities in beach sands in Guangdong, Guangxi, and Hainan. In addition, there were resources of titaniferous magnetite in Anhui and Sichuan. China's titanium reserves were estimated at 10 billion tons containing 800 million tons of titanium dioxide (TiO_2). For three plants, the annual production capacity for titanium sponge was only 3,000 tons. In comparison, the smallest plants worldwide had at least a 5,000-ton-per-year capacity for sponge, and the more efficient plants had an economy of scale of 10,000 tons. China was soliciting technology to treat the titaniferous slag produced at Ma'anshan, Anhui, and Panzhihua, Sichuan, for the production of pigment and metal.

Tungsten.—China had large resources of tungsten and was the world's largest producer. China continued to dominate the world market for tungsten; however, its exports were mainly concentrates, not value-added products. In 1988, China's exports of ore totaled 27,290 tons, valued at $96.8 million, and 408 tons of metal with a value of $3.2 million. Exports to the United States of ammonium paratungstate and tungstic acid were covered under a Sino-U.S. orderly marketing agreement. Chinese tungsten exports to the United States in 1988 were as shown in the text table.

	Quantity (kilograms)	Value
Ore	8,288,728	$24,096,539
Ammonium paratungstate	382,418	2,615,342
Metal:		
Waste and scrap, less than 50% tungsten	18,400	92,298
Waste and scrap, more than 50% tungsten	653,033	3,632,583
Unwrought alloy	394	6,602
Wrought (wire)	76	6,717
Other, wrought	1,256	53,395
Tungsten carbide	31,441	467,346
Tungsten compounds	912,581	6,976,841

Industrial Minerals.—China was a major world producer of a variety of industrial minerals. The important producers were China National Nonmetallic Minerals Industry Corp., Ministry of Chemical Industry, Ministry of Metallurgical Industry, and the State Administration for Building Materials. Other producers included China National Nonferrous Metals Industry Corp., Ministry of Geology and Mineral Resources, and a host of provincial and lower level entities.

Barite.—China was the world's largest producer of barite. The annual output was at least twice that of the U.S.S.R., the world's second largest producer. Mine output in 1988 may well have been around 1.5 million tons, and Guangxi accounted for about two-thirds of the total. China exported 1.1 million tons of barite, valued at $28.1 million, in 1988. During 1985–88, Chinese shipments accounted for close to 60% of U.S. imports of crude barite.

Cement.—China was the world's largest producer of cement and had an output of 203.4 million tons in 1988. However, because the output was still insufficient to meet the demands of national construction and reconstruction activities, many projects were forced to be postponed or canceled. China was a net importer of cement, importing 1,517,781 tons and exporting 152,190 tons in 1988.

Fluorspar.—China was probably the world's largest producer of fluorspar, outpacing production by Mexico and Mongolia. China's exports in 1988 totaled 911,976 tons, valued at $65.2 million. Based on the order of magnitude of export shipments and the growth in domestic demand by the chemicals and metallurgical sectors, China's mine output may have exceeded 1.5 million tons per year. Fluorspar occurred in numerous provinces, but the largest reserves were believed to be in Nei Monggol followed by Jiangxi.

Fertilizer.—China was the third largest producer and user of fertilizer after the United States and the U.S.S.R. In 1988, production of chemical fertilizers totaled 17,670,000 tons, estimated to be comprised of 14,930,000 tons of the nitrogenous component (N), 2,700,000 tons phosphatic (P), and 40,000 tons potassic nutrients (K). There are about 1,900 plants producing fertilizers: 1,200 for N, 700 for P, and 2 for K. Based solely on domestic production, the nutrient ingredient of chemical fertilizers output was strongly skewed to nitrogen, resulting in an N to P to K ratio of 375:70:1. To supplement domestic production, China imported N and P ingredients and imported virtually all its requirements for K. Total imports of fertilizers in 1988 were 14,706,323 tons comprised of 8,570,753 tons for N and 6,135,570 tons for P and K (about 3,400,000 tons for P and about 2,700,000 tons for K).

Salt.—After the United States, China was the world's second largest producer of salt. Salt production from evaporites and rock deposits increased 24%, reaching 21,944,000 tons in 1988. China ex-

ported about 1.1 million tons of salt in both 1986 and 1987. However, because of the growing demand by the domestic chemicals sector, exports in 1988 were only about one-third of that in the prior years. China's major salt operations were in Anhui, Hainan, Jiangsu, Jiangxi, Liaoning, Nei Monggol, Qinghai, Sichuan, and Xinjiang.

Talc.—China was a major world producer of both industrial- and cosmetic-grade talc. The talc-producing bases were in Guangxi, Liaoning, and Shandong. Output was sufficient to meet domestic demand as well as provide substantial quantities for export. In 1988, China exported close to 750,000 tons of talc. Inasmuch as the three talc-producing bases were undergoing expansion, China was expected to be a major factor in world talc commerce by 1990.

Mineral Fuels.—China was a major producer of fossil fuels. In 1988, coal production increased 2.9% to 947,090,000 tons; crude oil production increased 2.0% to 999 million barrels; and natural gas production increased 3.4% to 487 billion cubic feet. Electric power generation increased 8.6% to 539 billion killowatt hours. About 80% of China's electric energy was generated by thermal-fired plants, and the remainder was from hydropower. Although there were annual increases in energy output during the seventh 5-year plan, China was experiencing an energy crisis inasmuch as the growth in demand for industrial energy consumption continued to outstrip the growth in energy production. Because of the energy shortage, most manufacturing units operated on a 6-day week in 1987 and on a 5-day week in 1988. Energy-intensive user-industries have been particularly affected such as the Guizhou aluminum smelter, which cut operating capacity by one-third. Steel facilities were facing suspended operations because of low coal stockpiles. The ratio of China's growth in energy consumption to the growth in energy production capacity was estimated at 3:1.

One of the principal deterrents to expanding China's energy sector was the lack of investment capital for development. Energy prices, especially coal prices, were not realistic and usually were below the level of production costs. Hence, production units were not profitable and could not generate reinvestment capital. Moreover, Government investment in the energy sector decreased from 7.3% of the state budget in 1984 to 4.2% in 1987. In addition, coal designated for key state projects was sometimes redirected to less-important projects, which paid up to five times the prices set at the coal mine site. The growth in demand for energy by the nonprocessing sector, e.g., air conditioning and refrigeration, was competing with the growth in demand by the overheated manufacturing sector.

In 1988, China exported close to 226 million barrels of crude oil and refinery products. Part of the foreign exchange earnings was used to import energy-consuming products, e.g., automobiles and trucks. Hence, China not only exported part of its tight energy supply but exacerbated the situation by importing additional demand.

To help alleviate the crisis, the Government concentrated on energy-saving methods and in the commercialization of the energy-producing sector. The latter involved the creation of energy corporations such as for coal, petroleum and natural gas, etc., whose survival was dependent on profitability. The former included reducing the power available to the residential users, decreasing energy exports, energy conservation through more-efficient industrial processes, and reducing investment in nonproduction projects.

In September 1988, the new Ministry of Energy Resources formulated an energy development plan for 1989–2000. Some of the proposals were: develop minesite power stations and install power transmission lines; construct thermopower plants with a total generating capacity of 10 million kilowatts within 5 years; construct hydropower stations with a total generating capacity of 10 million kilowatt within 5 years; replace small, inefficient generating units with high-efficiency units; increase coal production in large coal-consuming areas such as Huainan and Huaibei in Anhui, Jiling and Yanzhou in Shandong, Shenbei and Tiefa in Liaoning, and Kailuan in Hebei; and increase coal production in Shaanxi, Shanxi, and western Nei Monggol and install transportation infrastructure to move coal from the aforementioned.

In 1988, China National Nuclear Corp. was formed under a charter to widen China's foreign economic and technological cooperation in the nuclear field. The company's activities would include the export of uranium, rare earths, other metallurgical products, and chemical raw materials and processed materials. It would also include export of nuclear technology and labor services. Imports would center on obtaining investment funds and technology and the establishment of foreign-funded enterprises. The company was formulating the tasks and goals of China's nuclear industry and laying the blueprint for the construction of nuclear power stations, production of nuclear fuels, and for the prospecting, mining, and processing of uranium minerals. The company's earnings in 1988 included $38 million in exports of uranium, calcium metal, and minireactors.

China's plans for nuclear power generation were modest. Construction of a 900-megawatt reactor at Daya Bay in Guangdong was 90% complete. Thus far, an investment of $800 million was spent on the project. Preparations for the construction of a twin 900-megawatt reactor at Daya Bay project were underway. These preparations included invitations for feasibility studies, selection of the construction site, and procurement of information on foreign nuclear equipment. Comple-

tion of the twin reactors at Daya Bay was scheduled for 1992. China was also completing the construction of a 300-megawatt demonstration pilot plant at Qinshan, Zhejiang, in Hangzhou Bay.

The Ministry of Energy Resources proposed the utilization of solar energy in areas lacking electricity and other energy resources and in areas where conditions allowed the utilization of solar energy. The annual solar radiation for China's land mass is 0.8–2.0 million kilocalories per square meter of ground surface. Solar energy resources, however, could be utilized best in the northern and northwestern regions where there is little cloud cover or rain. The lack of funds has retarded the development of new technology. Only $8 million was designated for developing solar energy in the current 5-year plan. Lacking domestic funds, China had obtained foreign funding and technical cooperation for the following: a whole village solar energy project in Yihezhuang, Daxing County, Beijing Municipality, in cooperation with the Federal Republic of Germany; a wind power and solar energy generating project on Dachen Dao off the Zhejiang coast in cooperation with the European Community (EC); a solar battery project in Yuzhong, Gansu, in cooperation with Japan; a solar energy heating and cooling technology demonstration project in Yuzhong, Gansu, in cooperation with the United Nations (UN). Because of the infancy of the domestic program, China's effective use of solar energy was not expected until the ninth 5-year plan (1996–2000).

China's development plan for the energy sector was to emphasize expanding electricity generation by coal-fired powerplants. There were to be increased efforts in the exploration and development of oil and natural gas. Moreover, there was to be an increased emphasis on the development of hydropower and nuclear energy.

Based on an annual economic growth of 6% during 1989–2000, China's primary energy demand was to reach 1.43 billion tons of standard coal equivalence (SCE) by 2000. By sector, this energy need translated into 1.4 billion tons of coal, 1.5 billion barrels of crude oil, 1.1 trillion cubic feet of natural gas, hydropower amounting to 90 million tons SCE, nuclear energy equivalent to 12 million tons SCE, and the generation of an electricity output of 1,200 billion kilowatt hours. The proportion of coal to total primary energy was to decrease from 73% in 1988 to 70% in 2000. The proportion of coal converted to electric power was expected to rise from 27% to 33%.

Coal.—In 1988, China used more than $1.6 billion in foreign funds in the coal sector through borrowing and through compensation trade and co-management arrangements. The projects undertaken included the development of two surface mines having a combined annual production capacity of 16 million tons and utilized Japanese loans. French export credit was used to purchase equipment for the Dongtan mine in Yanzhou, Shandong, which had an annual production capacity of 4 million tons. The Bailong mine in Shaanxi had an annual capacity of 1.2 million tons and was developed in cooperation with Romania through compensation trade arrangements. The surface mine at Antaibo, Shanxi, was developed in cooperation with the Occidental Oil Co. of the United States. A World Bank loan was used to develop the coal mine at Zhangshu, Shanxi, with an annual capacity of 4 million tons.

Between 1989–2000, the coal industry planned to focus on developing mine output in Shaanxi, Shanxi, and western Nei Monggol. Coal output, just from this area, was to reach 550–600 million tons by 2000, an increase of 300–350 million tons over the 1988 annual output. The added production from this area would afford shipment of 407–500 million tons of coal to other parts of China, an increase of 200–300 million tons over the 1988 shipment level.

The industry also planned to exploit the brown coal resources at Shenyang and Tiefa in Liaoning and at Huolinhe, Yiminhe, and Yuanbaoshan in eastern Nei Monggol. The industry was also to increase output from existing mines in Heilongjiang Province and at Hegang, Hunchun, Jixi, Qitaihe, and Shuangyashan in western Jilin.

In addition, the industry planned to develop new coalfields at Jining, Juye, Longkuo, Tengxian, Yanzhou, and Zaozhuang in southwestern Shandong Province. New fields were also to be exploited at Huaibei and Huainan in Anhui, Yongcheng in eastern Henan, and Yuxian, Hebei.

Other targets included expanding coal output of local and township mines so that their collective production would account for one-half of the national total by 2000. This would be the result of increasing the productivity of existing mines, increasing the output of quality coal through washing and dressing, and increasing the use of domestic and foreign funds for investment in coal mine construction.

Petroleum and Natural Gas.—In 1988, China National Petroleum and Natural Gas Corp. (CNPNGC) was chartered and given dominion over production and exploration and development of onshore oil and gas resources. In 1988, CNPNGC discovered new oil reserves totaling 3,950 million barrels, of which 2,900 million barrels were commercially recoverable, and 1.8 trillion cubic feet of natural gas, of which 1.1 trillion cubic feet were recoverable. The company estimated China's total onshore oil reserves to be as much as 470 billion barrels. Included in this total were 19 billion barrels in new discoveries which included six oil and natural gas-bearing formations in eastern Junggar Basin in Xinjiang, Chaluhe area of Jilin, south Kongdian areas of Dagang, Nanbao area in eastern Hebei, Erlian area of Nei Monggol, and Gaskule area of Qinghai. In addition, there were 12 new oil and natural gas-bearing formations discovered around Dagang, Daqing, Liaohe, Shengli, Xinjiang, Zhongyuan, and in

oilfields elsewhere in north China.

The company planned to explore the beaches and very shallow areas in Bohai inasmuch as a trial well sunk in the 80-square-kilometer Chengbei formation yielded a daily gas output of 3,500 cubic feet of natural gas and another trial well resulted in the discovery of a 200-meter-thick oil-bearing formation with estimated oil reserves of over 780 million barrels.

China National Offshore Oil Corp. (CNOOC) is responsible for offshore oil exploration and development. China's offshore oil production increased 5.6%, reaching 5.5 million barrels in 1988. Close to 87% of the production was by two fields. The Chengbei oilfield in Bohai, a Sino-Japanese operation, produced 2.7 million barrels. The Wei 10-3 field in Beibu, a Sino-French venture, produced 2.1 million barrels. Offshore oil exploration activities in 1988 were as shown in the text table.

Formation name	Location	Expected initial production	Annual output
Oil:			
Bozhong 28-1	Bo Hai	1989	2.6 million barrels
Bozhong 34-2/4	do.	1990	2.9 million barrels
Huizhou 21-1	Zhujiang	1990	7.1 million barrels
Huizhou 26-1	do.	1991	10.2 million barrels
Sijiang 23-4	do.	1992	10.9 million barrels
Wei 1-4	Beibu Wan	1991	8.7 million barrels
Suizhong 36-1	Liaodong Wan	1992	7.3 million barrels
Natural gas:			
Jinzhou 20-2	do.	1991	17.7 billion cubic feet

There were 9 reported oil-gas discoveries in the 25 structures where drilling operations were conducted, which were as shown in the text table.

	CNOOC-foreign	CNOOC alone	Total
Seismic lines kilometers	2,000	24,000	26,000
Drilling:			
Test wells	15	10	25
Delineation wells	6	11	17

Offshore construction continued on the infrastructure for commercial production from eight fields, which were as shown in the text table.

Formation name	Location	Contractor
Huizhou 26-1	Zhujiang Kou	ACT Group
Lufeng 13-2	do.	JHN Co.
Wenchang 9-2	do.	Esso Co.
Xijiang 30-2	do.	Phillips International Corp. and Pecten Orient Co.
Bozhong 29-3	Bo Hai	Japan-China Petroleum Development Co.
Wei 11-4	Beibu Wan	CNOOC.
Jinzhou 9-3	Liaodong Wan	Do.
Suizhong 36-1	do.	Do.
Beigaodian	do.	Do.

Feasibility studies and exploration studies were conducted in the following oilfields and gasfields: Bozhong 34, Jinzhou 9-3, Liuhua 11-1, Lufeng 13-1, Lufeng 13-2, Lufeng 22-1, Wei 6-1, Wei 11-4 North, and Wenchang 9-2.

CNOOC signed a development agreement with Amoco Inc. of the United States for the joint development of the Ya 13-1 gasfield in Yinggehai, Beibu Wan. Additional delineation wells were to be drilled in 1989 followed by construction. Initial production was expected in 1993.

HONG KONG[3]

Hong Kong was a well-established entrepot specializing in free trade and was also an important world financial market, active in foreign exchange dealings. Hong Kong was almost entirely dependent on imported materials in order to meet the needs of its population and the requirements of its light manufacturing industries. Because of its very limited domestic resources, Hong Kong had to import virtually all of its requirements, including food, consumer and capital goods, raw materials, fuels, and even water.

Production

Mineral production in Hong Kong is limited to clays, feldspar, and granite aggregate. At the end of 1988, there was only one mining lease in operation for the extraction of feldspar and kaolin. In 1988, five contract quarries supervised by the Geotechnical Control Office (GCO) of the Civil Engineering Services Department produced 10.7 million tons of granite aggregate. During the year, the domestic construction industry consumed almost 19 million tons of aggregate, crushed rock fines, and sand of which the shortfall in supply was imported from China. GCO was investigating the adjacent seabed to locate sand and gravel deposits suitable for use as fill material for land reclamation and for use as construction aggregate.

Hong Kong's largest industry was textiles and clothing, accounting for about 42% of industrial employment. The second largest industry was electronics, followed by watches and clocks, plastics, and electrical appliances. Other light manufactures included jewelry, optical and photographic goods, and travel goods. Hong Kong's heavy industry included ma-

TABLE 4

HONG KONG: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1984	1985	1986	1987	1988[p]
Cement, hydraulic	thousand tons	1,847	1,835	2,236	2,226	2,189
Clays:						
Kaolin		70	9,602	850	—	—
Other		92,293	82,446	68,737	92,504	61,888
Feldspar		23,101	26,777	35,208	22,853	11,050
Iron and steel: Metal: Steel, crude[e]		120,000	120,000	120,000	120,000	120,000
Quartz		34	116	33	—	—

[e]Estimated. [p]Preliminary.

[1]Table includes data available through Aug. 18, 1989.

[2]In addition to the commodities listed, crude construction materials such as sand and gravel and other varieties of stone presumably are produced, but available information is inadequate to make reliable estimates of output levels.

chinery manufacture to support local industry, ship and oil rig construction, servicing and repair, and aircraft maintenance and repair.

Trade

As of January 1, 1988, Hong Kong and a number of its trading partners adopted for use a new trade classification known as the Harmonized Commodity Coding and Description System (Harmonized System). The United States was to adopt and implement the Harmonized System effective January 1, 1989.

In 1988, total exports were valued at $63.17 billion, comprised of domestic exports, $27.89 billion, and reexports, $35.28 billion. Imports were valued at $63.90 billion.[4] The markets for domestic exports by major trading countries were: the United States, $9.34 billion; China, $4.88 billion; Federal Republic of Germany, $2.06 billion; United Kingdom, $1.99 billion; Japan, $1.46 billion; Canada, $0.77 billion; Singapore, $0.67 billion; the Netherlands, $0.63 billion; France $0.54 billion; and Australia $0.53 billion. The markets for reexports by major trading countries in 1988 were, in billion dollars, as shown in the text table.

	By major country of origin	By major country of destination
China	16.84	12.16
Japan	4.83	2.23
Taiwan	2.72	1.81
United States	2.45	6.34
Korea, Republic of	1.67	1.51
Germany, Federal Republic of	.54	1.11
Switzerland	.43	—
United Kingdom	.42	.82
France	.40	—
Singapore	.35	1.11
Australia	—	.57
Macao	—	.50

The suppliers of imports by major trading countries were: China, $19.94 billion; Japan, $11.91 billion; Taiwan, $5.68 billion; United States, $5.30 billion; Republic of Korea, $3.36 billion; Singapore, $2.37 billion; Federal Republic of Germany, $1.67 billion; United Kingdom, $1.66 billion; Switzerland, $1.17 billion; and Italy, $1.03 billion.

Clothing remains the largest component of domestic exports, valued at $8.62 billion. Exports of miscellaneous manufactured articles including jewelry and gold- and silver-smiths' ware, plastic toys, and plastic articles were $3.83 billion. Exports of photographic equipment and supplies, optical goods, and watches and clocks were valued at $2.47 billion. Exports of electrical equipment mainly of household type appliances and transistors and diodes were $2.24 billion. Domestic exports of telecommunications devices such as sound recording and reproducing equipment were valued at $2.22 billion. Other important exports included textiles, representing 7% of the total value of domestic exports, and office machines and automatic data processing equipment, 6%.

Imports of consumer goods in 1988 were valued at $21.06 billion, constituting 33% of total imports. Consumer goods consisted of: clothing; radios and television sets; diamonds; toys, games, and sporting goods; watches; travel goods; and household electrical appliances. Imports of capital goods, which included electrical, transport, and textile machinery and equipment, were valued at $9.90 billion. Other imports included foodstuffs valued at $4.11 billion and mineral fuels and related materials, $1.13 billion.

Hong Kong's trade surplus with the United States decreased from $11.6 bil-

TABLE 5

HONG KONG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Destinations, 1987	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals	—	109	2	China 58; Republic of Korea 28.
Aluminum:				
Ore and concentrate	19,987	25,971	—	Taiwan 16,970; Republic of Korea 4,991.
Oxides and hydroxides	681	1,193	—	Taiwan 750; Indonesia 400.
Metal including alloys:				
Scrap	22,080	27,656	40	Japan 25,155; China 1,425.
Unwrought	26,085	36,181	83	Republic of Korea 7,850; Thailand 6,788; Japan 5,392.
Semimanufactures	29,531	35,479	2,299	China 20,066; Taiwan 3,792.
Arsenic: Oxides and acids	308	441	36	India 105; Indonesia 102.
Beryllium: Metal including alloys, all forms value, thousands	—	$5	$3	Philippines $2.
Chromium: Oxides and hydroxides	387	1,858	—	China 1,401; Republic of Korea 179.
Cobalt: Oxides and hydroxides	31	21	—	Taiwan 9; Republic of Korea 7.
Copper:				
Oxides and hydroxides	150	219	—	All to China.
Sulfate	72	70	—	China 64; Republic of South Africa 5.
Metal including alloys:				
Scrap	27,947	36,954	—	Japan 22,935; China 7,602; Taiwan 4,495.
Unwrought	1,630	3,792	201	Japan 1,367; Republic of Korea 787.
Semimanufactures	9,576	17,756	47	China 10,680; Taiwan 3,808.
Gold:				
Waste and sweepings value, thousands	$23,919	$19,321	$2,370	United Kingdom $8,442; West Germany $4,776.
Metal including alloys, unwrought and partly wrought thousand troy ounces	1,542	508	1	Taiwan 206; China 83; West Germany 83.
Iron and steel: Metal:				
Scrap	275,389	345,259	—	Japan 94,453; Taiwan 73,514; Republic of Korea 61,326.
Pig iron, cast iron, related materials	133	421	—	China 286; Taiwan 83.
Ferroalloys:				
Ferromanganese	496	1,540	—	All to North Korea.
Ferrosilicon	3,483	30,135	—	Republic of Korea 17,730; Japan 6,639.
Unspecified	1,662	6,524	35	North Korea 4,524; Netherlands 1,040.
Steel, primary forms	24,842	13,174	—	Taiwan 13,144.
Semimanufactures:				
Bars, rods, angles, shapes, sections	456,109	181,751	33	Chile 137,318; Macau 23,510.
Universals, plates, sheets	187,525	203,006	4	China 175,883; Macau 4,142.
Hoop and strip	14,260	28,496	2	China 23,108.
Rails and accessories	231	40	—	China 20; Malaysia 20.
Wire	13,732	20,154	10	China 18,109; Macau 578.

See footnotes at end of table.

TABLE 5—Continued

HONG KONG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
METALS—Continued					
Iron and steel: Metal—Continued					
Semimanufactures—Continued					
Tubes, pipes, fittings		42,906	37,616	19	China 31,678; Macau 2,485.
Castings and forgings, rough		11	3	—	All to Taiwan.
Lead:					
Ore and concentrate		—	194	—	All to Netherlands.
Oxides		54	266	—	Indonesia 160; Australia 75.
Metal including alloys:					
Scrap		2,502	3,523	—	Taiwan 1,817; China 1,479; Thailand 267.
Unwrought		435	11,561	189	Republic of Korea 5,648; China 2,994.
Semimanufactures		269	106	—	China 73; Macau 12.
Magnesium: Metal including alloys:					
Scrap		52	42	—	Japan 18; Italy 12.
Unwrought		366	50	—	All to China.
Semimanufactures	value, thousands	$65	$4	—	Do.
Manganese:					
Ore and concentrate		200	725	—	Republic of Korea 500; Indonesia 125; Taiwan 100.
Oxides		1,213	1,965	—	Republic of Korea 368; Turkey 310; Ethiopia 302.
Mercury	76-pound flasks	2,719	7,035	726	Netherlands 2,742; Indonesia 887.
Molybdenum: Metal including alloys, unwrought		—	6	5	West Germany 1.
Nickel:					
Oxides and hydroxides		162	76	—	Taiwan 66; Republic of Korea 3.
Metal including alloys:					
Scrap		387	956	4	Japan 513; Taiwan 416.
Unwrought		4,865	6,227	—	Taiwan 2,065; North Korea 1,888; China 703.
Semimanufactures		376	260	—	Republic of Korea 75; Taiwan 72; China 44.
Platinum-group metals:					
Waste and sweepings	value, thousands	$4,168	$9,054	$5,169	United Kingdom $3,821.
Metals including alloys, unwrought and partly wrought	troy ounces	19,905	84,928	29,991	China 20,332; Japan 14,111.
Silver:					
Waste and sweepings	value, thousands	$22,641	$45,222	$5	West Germany $29,429; United Kingdom $9,085.
Metal including alloys, unwrought and partly wrought	thousand troy ounces	1,284	1,148	—	Thailand 392; China 367; Taiwan 223.
Tin:					
Ore and concentrate		3,709	6,912	70	Singapore 3,842; Republic of Korea 1,339.
Oxides	kilograms	—	20	—	All to China.
Metal including alloys:					
Scrap		24	155	34	United Kingdom 113.
Unwrought		1,943	2,176	877	Japan 527; Taiwan 354.
Semimanufactures		747	1,196	(2)	Taiwan 474; China 327; Singapore 249.

See footnotes at end of table.

TABLE 5—Continued

HONG KONG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Destinations, 1987	
			United States	Other (principal)
METALS—Continued				
Titanium: Oxides	2,840	4,784	512	China 1,545; Taiwan 345.
Tungsten:				
Ore and concentrate	2,013	3,692	713	Netherlands 1,881; North Korea 855.
Metal including alloys:				
Scrap	3	7	3	Netherlands 4.
Unwrought	2	4	1	China 2.
Uranium and/or thorium: Oxides and other compounds	8	19	(2)	Japan 16.
Zinc:				
Oxides	835	763	54	Republic of South Africa 164; Taiwan 80.
Blue powder	51	154	—	All to China.
Metal including alloys:				
Scrap	33	109	—	All to China.
Unwrought	31,245	68,391	4,697	Republic of Korea 30,655; China 12,894.
Semimanufactures	223	123	—	China 111; Indonesia 6.
Other:				
Ores and concentrates	9,389	6,373	204	Republic of Korea 4,168; Taiwan 587.
Metalloids, unspecified[3]	2,215	18,033	83	Republic of Korea 5,360; Japan 3,642.
Ashes and residues	473	1,888	—	China 913; Taiwan 697; Japan 195.
Base metals including alloys, all forms	5,495	11,067	896	China 3,533; Netherlands 2,337.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural: Corundum, emery, pumice, etc.	2,773	10,783	—	China 3,051; Macau 2,754; Indonesia 914.
Artificial:				
Corundum	18,117	26,258	725	Republic of Korea 9,464; Taiwan 8,823.
Silicon carbide	1,919	4,319	512	Taiwan 1,778; Republic of Korea 1,339.
Dust and powder of precious and semiprecious stones including diamond value, thousands	$592	$329	$152	Republic of Korea $150.
Grinding and polishing wheels and stones	3,213	2,671	222	Indonesia 962; China 622.
Asbestos, crude	21	36	—	All to China.
Barite and witherite	120	2,396	—	Japan 1,223; Republic of Korea 785.
Boron materials:				
Crude natural borates	—	9	—	All to Republic of Korea.
Oxides and acids	312	9,503	—	China 9,334; North Korea 95.
Bromine including fluorine	22	—		
Cement thousand tons	902	1,064	—	Macau 571; China 474.
Clays, crude:				
Kaolin	73,866	176,647	—	Taiwan 134,944; Republic of Korea 27,132.
Unspecified	46,565	8,084	—	Taiwan 5,828; Republic of Korea 958; China 706.

See footnotes at end of table.

TABLE 5—Continued

HONG KONG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Diamond:					
Gem, not set or strung	carats	500,091	746,988	174,706	Belgium-Luxembourg 239,382; Thailand 89,470.
Industrial stones	do.	357,939	136,678	1,272	Netherlands 74,111; China 41,120.
Diatomite and other infusorial earth		442	624	—	China 608.
Feldspar, fluorspar, related materials		50,555	77,515	—	Taiwan 63,544; Indonesia 7,198; Republic of Korea 5,042.
Fertilizer materials:					
Crude, n.e.s.		800	590	—	Taiwan 246; China 130; Indonesia 100.
Manufactured:					
Ammonia		47	108	—	China 90; Macau 11.
Nitrogenous		2,448	23,288	—	China 21,786; Philippines 1,423.
Phosphatic		—	2,622	—	Singapore 1,329; Malaysia 1,162.
Potassic		—	10	—	All to China.
Unspecified and mixed		6,488	2,862	2	China 2,337; Japan 500.
Graphite, natural		3,036	3,781	—	Republic of Korea 2,769; Taiwan 573.
Gypsum and plaster		4,709	4,960	15	Macau 3,000; China 775.
Iodine	kilograms	1,703	2,475	—	China 2,000; North Korea 475.
Lime		47	226	—	All to China.
Magnesium compounds:					
Magnesite, crude		28,167	24,343	—	Taiwan 17,630; Indonesia 4,225; Republic of Korea 700.
Oxides and hydroxides		1,311	1,295	—	Republic of South Africa 600; Republic of Korea 360; China 110.
Mica:					
Crude including splittings and waste		6	172	—	Taiwan 153; Republic of South Africa 11.
Worked including agglomerated splittings		83	270	—	China 209; Indonesia 18.
Nitrates, crude		—	495	—	Republic of South Africa 184; Australia 110; Indonesia 80.
Phosphates, crude		—	550	—	All to Malaysia.
Pigments, mineral:					
Natural, crude		970	648	—	Indonesia 255; Japan 140; Egypt 103.
Iron oxides and hydroxides, processed		3,037	4,151	15	China 1,204; Indonesia 1,122.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$106,213	$131,937	$33,183	Japan $44,176; China $13,111.
Synthetic	do.	$705	$920	$309	Thailand $101; Republic of Korea $90.
Salt and brine		947	614	—	China 248; Papua New Guinea 232.
Sodium compounds, n.e.s.:					
Carbonate, manufactured		378,118	100,819	—	China 100,075; Vietnam 227.
Sulfate, manufactured		12,729	47,274	—	Republic of Korea 19,843; Indonesia 13,471.

See footnotes at end of table.

TABLE 5—Continued

HONG KONG: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Destinations, 1987	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	6,380	9,056	121	Taiwan 7,433; China 595.
Worked	10,939	16,454	629	China 13,125; Macau 1,022.
Dolomite, chiefly refractory-grade	36	66	—	China 54; Indonesia 12.
Gravel and crushed rock	1,413	1,704	—	China 928; Taiwan 585.
Limestone other than dimension	1,261	2,411	—	China 2,341.
Quartz and quartzite	1,183	935	—	Taiwan 713; Bangladesh 100.
Sand other than metal-bearing	639	537	—	China 275; Macau 115; Taiwan 105.
Sulfur:				
Elemental:				
Crude including native and byproduct	5,066	112	—	Indonesia 100.
Colloidal, precipitated, sublimed	96	88	—	Indonesia 75; China 12.
Sulfuric acid	64	155	—	China 138; Indonesia 9.
Talc, steatite, soapstone, pyrophyllite	29,250	25,204	—	Indonesia 12,590; Republic of Korea 6,280; Taiwan 4,978.
Other:				
Crude	1,441	849	—	Taiwan 589; China 256.
Slag and dross, not metal-bearing	359	964	—	China 712; Singapore 150; Macau 100.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	21	3	—	All to China.
Carbon black	3,446	1,649	—	North Korea 941; China 194; Indonesia 184.
Coal: Anthracite	10	—		
Coke and semicoke	500	635	—	Indonesia 600.
Petroleum refinery products:				
Liquefied petroleum gas thousand 42-gallon barrels	118	154	—	Macau 86; China 67.
Gasoline do.	151	165	—	Macau 128; China 37.
Mineral jelly and wax do.	192	160	—	Singapore 85; Republic of South Africa 17; Indonesia 12.
Kerosene and jet fuel do.	39	64	—	China 40; Macau 23.
Distillate fuel oil do.	2,570	1,972	—	China 1,807; Macau 161.
Lubricants do.	266	448	—	China 267; Taiwan 101.
Nonlubricating oils do.	29	24	—	Indonesia 14; Taiwan 5.
Residual fuel oil do.	2,728	2,001	(2)	Macau 997; China 874.
Bitumen and other residues do.	8	5	—	Macau 3.
Bituminous mixtures do.	(2)	(2)	—	NA.

NA Not available.
[1] Table prepared by Audrey D. Wilkes.
[2] Less than 1/2 unit.
[3] Reported under SITC item 522.120 as "selenium, tellurium, phosphorus, arsenic, silicon and boron."

TABLE 6

HONG KONG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Sources, 1987	
			United States	Other (principal)
METALS				
Alkali and alkaline-earth metals	—	193	—	France 72; China 67; Belgium-Luxembourg 50.
Aluminum:				
Ore and concentrate	20,526	25,815	—	China 25,758.
Oxides and hydroxides	57	943	10	China 848; Japan 54.
Metal including alloys:				
Scrap	1,301	3,072	320	China 1,735; Macau 627.
Unwrought	46,950	70,480	590	China 26,732; Canada 19,177; Australia 9,894.
Semimanufactures	58,870	70,952	7,368	Taiwan 14,460; Australia 11,396; Japan 10,880.
Arsenic: Oxides and acids	116	375	—	All from China.
Beryllium: Metal including alloys, all forms value, thousands	$2	—		
Chromium: Oxides and hydroxides	747	2,987	426	West Germany 714; China 558.
Cobalt: Oxides and hydroxides	48	20	—	China 14; United Kingdom 6.
Copper:				
Ore and concentrate	—	5	—	All from Republic of South Africa.
Oxides and hydroxides	288	331	72	West Germany 108; Italy 90.
Sulfate	373	578	39	United Kingdom 146; Thailand 126.
Metal including alloys:				
Scrap	6,784	12,731	3,403	China 6,844; Singapore 1,495.
Unwrought	2,357	9,578	1,196	China 6,714; Chile 495.
Semimanufactures	70,247	97,771	4,185	Japan 36,423; China 20,188; Taiwan 10,994.
Gold:				
Waste and sweepings value, thousands	$587	$2,338	$14	China $1,446; Malaysia $561.
Metal including alloys, unwrought and partly wrought thousand troy ounces	1,648	5,056	34	Switzerland 2,386; Australia 870; United Kingdom 742.
Iron and steel: Metal:				
Scrap	33,669	43,600	2,406	China 35,433; Japan 2,602.
Pig iron, cast iron, related materials	4,316	7,523	165	China 6,022; North Korea 959.
Ferroalloys:				
Ferromanganese	1,998	2,442	—	Republic of South Africa 735; Netherlands 515; Norway 512.
Ferrosilicon	4,617	34,911	—	China 34,093.
Unspecified	3,220	7,770	1	Republic of South Africa 3,698; China 2,968.
Steel, primary forms	173,778	127,032	—	Republic of South Africa 58,948; Venezuela 30,637.
Semimanufactures:				
Bars, rods, angles, shapes, sections	1,533,955	1,321,524	101	Republic of South Africa 263,592; China 173,616; Japan 148,629.
Universals, plates, sheets	597,622	766,848	41,947	Japan 399,162; Republic of South Africa 64,516.
Hoop and strip	45,121	72,083	1,868	Japan 56,396; United Kingdom 2,631; France 2,618.
Rails and accessories[2]	3,633	5,419	—	United Kingdom 4,021; Belgium-Luxembourg 1,349.

See footnotes at end of table.

TABLE 6—Continued

HONG KONG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
METALS—Continued					
Iron and steel: Metal—Continued					
Semimanufactures—Continued					
Wire		57,319	69,180	176	China 29,938; Republic of Korea 13,627; Japan 12,431.
Tubes, pipes, fittings		205,374	205,322	355	Japan 58,433; China 45,907; Republic of South Africa 34,700.
Castings and forgings, rough		965	566	1	Taiwan 455; China 82.
Lead:					
Ore and concentrate		—	512	—	All from China.
Oxides		168	334	4	China 302.
Metal including alloys:					
Scrap		681	524	23	Singapore 244; China 80; Macau 78.
Unwrought		5,071	12,006	7	China 10,844; Malaysia 410.
Semimanufactures		213	295	—	Republic of South Africa 131; China 100.
Magnesium: Metal including alloys:					
Unwrought		396	112	39	France 51; China 12.
Semimanufactures	value, thousands	$54	$7	$1	China $4.
Manganese:					
Ore and concentrate		341	665	—	All from China.
Oxides		1,455	2,297	—	China 1,875; Japan 336.
Mercury	76-pound flasks	3,586	7,367	—	China 7,358.
Molybdenum: Metal including alloys, all forms		(3)	[4]6	—	Mainly from China.
Nickel:					
Oxides and hydroxides		199	40	—	Canada 24; Australia 11.
Metal including alloys:					
Scrap		—	456	57	Taiwan 329.
Unwrought		7,053	6,220	59	Norway 2,241; Australia 1,509; Canada 904.
Semimanufactures		327	230	22	Norway 96; Australia 17.
Platinum-group metals:					
Waste and sweepings	value, thousands	$8	$1,576	—	Republic of Korea $1,549.
Metals including alloys, unwrought and partly wrought	troy ounces	18,895	54,129	1	United Kingdom 24,114; Republic of South Africa 16,397.
Silver:					
Waste and sweepings	value, thousands	$39	$551	—	Philippines $304; West Germany $116.
Metal including alloys, unwrought and partly wrought	thousand troy ounces	1,904	1,972	50	Australia 604; West Germany 494; United Kingdom 342.
Tin:					
Ore and concentrate		1,755	7,985	—	All from China.
Metal including alloys:					
Scrap		35	25	—	Malaysia 15; China 10.
Unwrought		3,568	4,655	11	China 4,310; Singapore 161.
Semimanufactures		634	835	4	China 363; Singapore 222; Japan 138.

See footnotes at end of table.

TABLE 6—Continued

HONG KONG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
METALS—Continued					
Titanium: Oxides		8,283	11,308	853	China 3,792; Australia 2,181.
Tungsten:					
Ore and concentrate		3,626	1,278	—	China 1,082; Singapore 196.
Metal including alloys:					
Scrap		1	3	(3)	Mainly from China.
Semimanufactures		7	9	1	China 5; Japan 2.
Uranium and thorium: Oxides and other compounds		22	43	(3)	France 26; China 10.
Zinc:					
Oxides		1,171	1,324	8	China 928; France 242.
Blue powder		17	187	—	Republic of Korea 102; Norway 70.
Metal including alloys:					
Scrap		539	599	21	Macau 380; China 158.
Unwrought		70,262	95,652	175	China 61,148; Australia 14,616; Belgium-Luxembourg 8,713.
Semimanufactures		710	714	—	West Germany 285; Belgium-Luxembourg 135; United Kingdom 94.
Other:					
Ores and concentrates		8,301	4,925	—	China 4,835.
Metalloids, unspecified[5]		2,597	19,718	14	China 19,497.
Ashes and residues		5,914	7,153	231	China 5,816; Singapore 712.
Base metals including alloys, all forms		7,026	12,998	2,883	China 8,792.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		27,672	60,956	254	Indonesia 44,630; China 10,306; Japan 3,859.
Artificial:					
Corundum		18,710	27,084	292	China 25,717; Japan 635.
Silicon carbide		1,765	4,040	—	China 4,000.
Dust and powder of precious and semiprecious stones including diamond	value, thousands	$97	$81	$14	United Kingdom $30; Belgium-Luxembourg $12.
Grinding and polishing wheels and stones		4,062	3,991	148	China 1,908; Japan 960.
Asbestos, crude		82	78	—	China 35; Zimbabwe 30.
Barite and witherite		425	3,060	—	China 2,908; Thailand 72.
Boron materials:					
Crude natural borates		—	18	—	All from Turkey.
Oxides and acids		559	12,494	11,864	China 593.
Bromine including fluorine		44	5	—	Japan 4.
Cement	thousand tons	4,131	4,453	—	Japan 1,688; Republic of Korea 1,242; Taiwan 1,163.

See footnotes at end of table.

TABLE 6—Continued

HONG KONG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Clays, crude:					
Kaolin		82,336	197,422	737	China 173,421; Macau 21,600.
Unspecified		61,958	19,611	1,115	China 15,086; France 2,816.
Cryolite and chiolite		5	2	—	All from Denmark.
Diamond:					
Gem, not set or strung	thousand carats	2,091	2,573	195	India 1,061; Israel 692.
Industrial stones	do.	427	356	16	Netherlands 142; United Kingdom 132.
Diatomite and other infusorial earth		984	1,227	1,221	China 6.
Feldspar, fluorspar, related materials		37,396	69,976	—	All from China.
Fertilizer materials:					
Crude, n.e.s.		812	1,989	—	China 822; Netherlands 433; Canada 430.
Manufactured:					
Ammonia		2,045	2,493	1	China 2,395.
Nitrogenous		6,735	29,375	44	U.S.S.R. 21,466; China 2,817.
Phosphatic		—	1,560	—	All from China.
Unspecified and mixed		14,265	10,476	55	West Germany 8,800; China 501; Taiwan 436.
Graphite, natural		3,685	4,104	—	China 4,101.
Gypsum and plaster		110,865	152,552	292	Thailand 93,086; Japan 25,115.
Iodine	kilograms	1,500	2,426	1,350	United Kingdom 556.
Lime		44,588	43,893	—	China 43,865.
Magnesium compounds:					
Magnesite, crude		29,791	26,891	—	All from China.
Oxides and hydroxides		1,710	1,431	—	Japan 1,105; China 310.
Mica:					
Crude including splittings and waste		48	57	—	India 24; United Kingdom 24.
Worked including agglomerated splittings		1,022	1,408	2	Belgium-Luxembourg 585; Japan 444.
Nitrates, crude		—	1,420	96	China 1,149.
Phosphates, crude		—	350	—	All from China.
Pigments, mineral:					
Natural, crude		940	523	—	China 514.
Iron oxides and hydroxides, processed		5,288	6,587	1,050	China 3,166; Japan 988.
Precious and semiprecious stones other than diamond:					
Natural	value, thousands	$77,271	$122,615	$14,521	Thailand $37,324; India $13,164; Japan $9,755.
Synthetic	do.	$2,699	$2,276	$524	West Germany $414; Switzerland $314.
Salt and brine		130,537	129,938	10	China 118,469; West Germany 4,909.
Sodium compounds, n.e.s.:					
Carbonate, manufactured		414,020	189,064	144,470	East Germany 17,327; West Germany 9,826.
Sulfate, manufactured		45,878	78,682	5	China 76,708; Taiwan 1,920.

See footnotes at end of table.

TABLE 6—Continued

HONG KONG: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		13,644	15,721	—	China 13,886; Taiwan 1,346.
Worked		35,084	58,191	7	Italy 38,441; China 8,425; Spain 5,361.
Dolomite, chiefly refractory grade		201	136	—	United Kingdom 82; Norway 54.
Gravel and crushed rock	thousand tons	4,849	6,520	(3)	China 6,461.
Limestone other than dimension		38,448	32,744	30	China 32,118.
Quartz and quartzite		8,243	2,698	—	China 2,493; Belgium-Luxembourg 167.
Sand other than metal-bearing	thousand tons	1,273	1,261	(3)	China 1,259.
Sulfur:					
Elemental:					
Crude including native and byproduct		5,342	294	10	China 140; Thailand 72; West Germany 54.
Colloidal, precipitated, sublimed		294	434	—	Republic of Korea 270; China 76; West Germany 76.
Dioxide		19	—		
Sulfuric acid		6,613	7,505	40	China 7,324.
Talc, steatite, soapstone, pyrophyllite		32,707	30,312	289	China 29,404; Norway 301.
Other:					
Crude		6,997	3,185	673	China 1,973; Republic of South Africa 396.
Slag and dross, not metal-bearing		1,116	412	—	China 266; Thailand 138.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		59	50	35	United Kingdom 15.
Carbon black		3,281	2,376	146	China 1,455; Republic of Korea 200.
Coal: Anthracite and bituminous	thousand tons	6,393	8,010	—	Australia 2,972; Republic of South Africa 2,559; China 1,963.
Coke and semicoke		3,860	3,544	—	China 2,520; Japan 698.
Petroleum refinery products:					
Liquefied petroleum gas	thousand 42-gallon barrels	1,995	2,056	(3)	Singapore 1,027; Philippines 727.
Gasoline:					
Aviation	do.	1	2	—	All from Australia.
Motor	do.	1,701	1,839	—	Singapore 1,246; China 360.
Naphtha including white spirit	do.	2,133	2,199	107	Singapore 2,062.
Mineral jelly and wax	do.	266	239	4	China 223; Japan 10.
Kerosene and jet fuel	do.	9,522	10,017	56	Singapore 8,151; China 1,393.
Distillate fuel oil	do.	13,805	12,914	45	Singapore 7,556; China 3,990.
Lubricants	do.	607	782	85	Singapore 284; China 175; Japan 68.
Nonlubricating oils	do.	54	56	1	China 49.
Residual fuel oil	do.	17,296	14,431	—	Singapore 10,425; China 1,449; Taiwan 909.
Bitumen and other residues	do.	212	258	—	Taiwan 115; Singapore 107.
Bituminous mixtures	do.	5	2	(3)	Japan 1.

[1] Table prepared by Audrey D. Wilkes.
[2] Excludes unreported quantities valued at $186,400 in 1986 and $972,000 in 1987.
[3] Less than 1/2 unit.
[4] Excludes unreported quantity valued at $18,000.
[5] Reported under SITC item 522.120 as "selenium, tellurium, phosphorus, arsenic, silicon and boron."

lion in 1987 to $8.2 billion in 1988. To help reduce its growing trade deficit, the U.S. Senate and the U.S. House of Representatives passed the Omnibus Trade and Competitiveness Act of 1988, which was signed into law by the President on August 23, 1988. In addition, Hong Kong, as well as the Republic of Korea, Singapore, and Taiwan were to be removed from the list of countries eligible for duty-free treatment under the U.S. Generalized System of Preferences as of January 2, 1989. About 16% of Hong Kong's exports to the United States benefited from the tariff preferences provided under this scheme.

MONGOLIA[5]

Mongolia was one of the world's leading producers of fluorspar, a significant producer and exporter of copper and molybdenum concentrate, and was becoming an important producer and exporter of tungsten concentrate in the centrally planned economy countries. Other minerals produced in Mongolia included gold, silver, tin, and zinc for export; and clay, coal, gypsum, limestone, salt, and construction materials for domestic consumption. Domestic requirements for petroleum products, iron and steel, nonferrous metals products, and fertilizer materials were met by imports, principally from the U.S.S.R. Mongolia also imported considerable amounts of cement and coal from the U.S.S.R. to meet the growing demand by the electrical power and construction industries.

In 1988, industrial output reportedly increased 5%, and the national income grew 4.3%. Mongolia's gross domestic product (GDP) was estimated at $1.9 billion,[6] and the output of the mining industry was estimated to contribute 19% to Mongolia's GDP. Production of copper, molybdenum, and tungsten reportedly continued to increase because of increased exports of metallic minerals to the U.S.S.R. and Eastern European members of the Council of Mutual Economic Assistance (CMEA). Production of coal, copper, fluorspar, molybdenum, and tungsten jointly accounted for 95% of the Mongolian minerals output. Exports of these minerals except coal, all in the form of ore and/or concentrate, accounted for 45% of Mongolia's exports in 1988.

According to the latest Government statistics, because of increased exports, Mongolia's trade deficit improved slightly to $334.1 million from $344.5 million in 1987. In 1988, exports increased 3.9% to $659.5 million and imports rose 1.5% to $993.6 million. Mongolia's two-way trade with CMEA countries declined slightly to $1,552.9 million, of which the U.S.S.R. accounted for 87%. However, two-way trade with the market economy countries surged 46% to $55 million, of which Japan and Switzerland accounted for 43% and 19%, respectively. Two-way trade with other centrally planned countries, including China, Laos, North Korea, and Yugoslavia, rose 10% to $44 million, of which China accounted for 44%.

In October, an agreement was signed between Mongolia and Poland for cooperation in exploration for minerals in the Gobi Desert. In November, the Ministry of Power, Mining Industry, and Geology of Mongolia and the Ministry of Geology of the U.S.S.R. reportedly formed the fourth joint geological survey of precious metals in the Tuyun Gol River Valley of the Dzaamar region. The joint expedition was financed equally by the two countries. As a result of the continuing joint Soviet-Mongolian geological expedition, a rich silver deposit reportedly was discovered in northwestern Mongolia near the Soviet border in 1988.

Commodity Review

Metals.—Production of copper and molybdenum by the Mongolian-Soviet Erdenet Mining and Concentrating Works from the Erdenet Mine in northern Mongolia continued to exceed its full capacity of 16 million tons per year since 1986.[7] About 95% of the concentrate was exported to the Urals region of the U.S.S.R. for smelting. The fifth-phase construction for expansion of ore production capacity to 20 million tons per year was undertaken by Mongolenergostroi, a Soviet construction company. Further expansion of capacity to 32 million tons per year by the year 2000 was planned. For the first time since Erdenet went into operation in 1979, Outokumpu Oy of Finland was involved in negotiation with Erdenet on a barter trade agreement. This agreement was to introduce new equipment and technology in order to upgrade and modernize Erdenet's treatment plant. In return, Outokumpu would receive from Erdenet 20,000 tons per year of copper concentrate for 10 years or 40,000 tons per year for 5 years.[8]

According to the Government of Mongolia, a significant copper and molybdenum deposit had been discovered in the early 1970's at Tsagaansuvarga in Dornogovi Province of the eastern Gobi Desert. The deposit is 170 kilometers southwest of the railway station at Zuun-Bayan, 220 kilometers southwest of Saynshand, and 550 kilometers south of Ulaanbaatar. Ore reserves were estimated in 1982 to be 240 million tons. The deposit was estimated to have an average content of 0.53% copper and 0.018% molybdenum plus 0.084 gram of gold per ton, 0.39 gram of rhenium per ton, 8.3 grams of selenium per ton, 2.63 grams of silver per ton, and 12.8 grams of tellurium per ton. The copper ore reportedly contained little pyrite and could be concentrated easily.[9]

Tin was produced mainly from the open pit at Modoto in the Hentiy Province and as a byproduct of tungsten mining. Since 1974, tungsten had been produced mainly from the Burensogt Mine in Suhbaatar. In recent years, two small tungsten mines reportedly were

TABLE 7

MONGOLIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1984	1985	1986	1987	1988[p]
Cement, hydraulic	thousand tons	141	151	[e]200	[e]200	[e]200
Coal:						
Anthracite and bituminous	do.	458	480	[e]500	[e]500	[e]500
Lignite and brown	do.	4,973	6,038	[e]6,200	[e]6,300	[e]6,500
Total	**do.**	**5,431**	**6,518**	**[e]6,700**	**[e]6,800**	**[e]7,000**
Copper, mine output, Cu content[e]		118,000	128,000	136,000	[r]140,000	160,000
Fluorspar, all grades	thousand tons	747	787	[e]790	[e]800	[e]800
Gypsum[e]	do.	32	32	32	32	32
Lime, hydrated and quicklime[e]	do.	95	95	95	95	95
Molybdenum, mine output, Mo content[e]		1,000	1,000	1,100	1,100	1,100
Petroleum refinery products:[e]						
Kerosene	thousand 42-gallon barrels	23	23	23	23	23
Residual fuel oil	do.	20	20	20	20	20
Salt[e]		16,000	16,000	16,000	16,000	16,000
Tin, mine output, Sn content[e]		1,000	1,000	1,000	1,000	1,200
Tungsten, mine output, W content[e]		1,500	1,500	1,500	1,500	2,000

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Table includes data available through Aug. 18, 1989.

[2]In addition to the commodities listed, crude construction materials such as sand and gravel and varieties of stone presumably are produced, but available information is inadequate to make reliable estimates of output levels.

developed and expanded at Kyzyltay and Kobdogol. In September, another tungsten mine was opened at Tsagaandavaa, about 60 kilometers from Ulaanbaatar.

The Tsagaan-davaa Mine was developed by Wolframvest, a Hungarian company, under a bilateral agreement signed in 1984 between Mongolia and Hungary. The Wolframvest is a joint venture of the Central Development Institute for Mining of Budapest, the Mecsek Ores Mines of Pecs, and the Metal Alloys Factory of Salgotarjan. Construction of the mine and the concentrator took 3 years to complete and cost about $5.4 million. The Tsagaandavaa tungsten mining and milling facilities were capable of processing 36,000 tons per year of ore and producing 3,000 tons per year of concentrate. The operation was expected to reach full capacity in spring 1989. Tungsten contained in concentrate was between

TABLE 8

MONGOLIA: APPARENT EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987[p]	Principal destinations, 1987
Aluminum: Metal including alloys, scrap		195	—	
Cement[2]		13,300	21,700	NA.
Chromium: Oxides and hydroxides		3	—	
Copper:				
Ore and concentrate		7,338	10,314	All to Finland.
Sulfate		17	—	
Graphite, natural		18	—	
Iron and steel: Metal: Semimanufactures:				
Universals, plates, sheets		92	25	All to Pakistan.
Mercury	76-pound flasks	—	406	Do.

[p]Preliminary. NA Not available.

[1]Table prepared by Audrey D. Wilkes. Owing to a lack of official trade data published by Mongolia, this table should not be taken as a complete presentation of this country's mineral exports. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries. The United States did not report any imports of mineral commodities from Mongolia in 1987.

[2]Statistical Yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

60% and 65%. Under the agreement, 88% of the annual output would be exported to Hungary. As part of the mine development, a water supply and sewage system was also completed by the Hungarian company in 1988.[10]

According to a Soviet source,[11] two tin-tungsten deposits had been identified at Bayn-mod and Elstuin. They were reported to average between 300 grams and 800 grams of tin and between 60 grams and 650 grams of tungsten trioxide per cubic meter. Gold and zinc produced in north-central Mongolia were delivered for processing by the Yoroo Mining Enterprise in Selenge Province. A lead-zinc deposit was identified at Tumertyn-obo in Suhbaatar Province.

Industrial Minerals.—Production of metallurgical-grade fluorspar reportedly reached a peak in 1985–86 and began to level off in 1987–88. Mongolia continued to export almost all of the fluorspar production to the U.S.S.R. for consumption by the Soviet iron and steel industry. Production of fluorspar was by the Mongolian-Soviet joint enterprise, Mongolsovtsvetmet, from three underground mines at Berh and Dehgehrkhan in Hentiy Province and at Bor-ondor in Dornogovi Province as well as from three open pits at Har-Ayrag in Dornogovi Province, Chuluttsagandel in Tov Province, and Dzuntsagaandel in Hentiy Province. Proven reserves of fluorspar in Mongolia were estimated at 22 million tons and averaged between 35% and 45% CaF_2.[12]

Development of the Urandosh phosphorite deposit along the western shores of Hovsgol Lake in northern Mongolia, reportedly, has been postponed because of environmental concerns. However, the Government planned to develop another significant phosphorite deposit about 100 kilometers from Hovsgol Lake in the Burenhaan Valley area. Ore reserves at the Burenhaan deposit were estimated at 400 million tons, averaging 20% P_2O_5 in 1970.[13]

TABLE 9

MONGOLIA: APPARENT IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987[p]	Principal sources, 1987
Abrasives, n.e.s.: Grinding and polishing wheels and stones	4	[2]7	Italy 6, United Kingdom 1.
Aluminum: Metal including alloys, all forms	1	2	All from Italy.
Cement[3]	48,900	46,900	NA.
Coal: Anthracite and bituminous[3]	—	70,000	NA.
Copper: Metal including alloys, semimanufactures	—	([4])	All from Austria.
Fertilizer materials: Manufactured:			
Nitrogenous[3]	14,000	14,100	NA.
Phosphatic (P_2O_5 content)[3]	19,000	18,300	NA.
Gypsum and plaster	—	2	All from Italy.
Iron and steel: Metal: Semimanufactures:[2]			
Tubes, pipes, fittings	11,500	11,000	NA.
Unspecified	74,400	67,400	NA.
Petroleum refinery products[3] thousand 42-gallon barrels	6,077	6,483	NA.
Sodium compounds, n.e.s.: Carbonate, natural and manufactured[3]	1,700	2,400	NA.
Sulfur: Sulfuric acid[3]	1,400	1,400	NA.

[p] Preliminary. NA Not available.

[1] Table prepared by Audrey D. Wilkes. Owing to a lack of official trade data published by Mongolia, this table should not be taken as a complete presentation of this country's mineral imports. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries. The United States did not report any exports of mineral commodities to Mongolia during 1987.

[2] Excludes unreported quantity valued at $1,000 exported by Japan.

[3] Statistical Yearbook of Members of the Council for Mutual Economic Assistance. Moscow, U.S.S.R.

[4] Less than 1/2 unit.

Other industrial minerals produced in Mongolia included construction aggregate, cement, refractory clay, gypsum, salt, and volcanic slag. Despite active construction, cement production reportedly dropped in 1988 because of new environmental regulations imposed by the Government.

TAIWAN[14]

In terms of current dollars, Taiwan's GNP grew from $99.3 billion in 1987 to $119.9 billion in 1988.[15] In constant 1981 prices, the GNP in 1988 was $107.4 billion, representing a real growth of 7.3%. Based on a population of 19.9 million, the per capita GNP increased 19.2% to $6,022, the fourth highest in Asia after Japan, Hong Kong, and Singapore. The labor force totaled 8.1 million, composed of 5.0 million males and 3.1 million females. The unemployment rate was 1.6%, down from 1.9% in the previous year. Employment in the mining and quarrying sector decreased to 27,000, compared with 2.7 million for manufacturing, 1.5 million for commerce, 1.3 million for public administration and social services, and 1.1 million for agriculture. The value of output by the mining and quarrying sector was only 0.5% of the net domestic product

(NDP), dwarfed by the input of Taiwan's manufacturing industries of 38.1%. The input to the country's NDP by sector, in million current dollars, was as follows:

Sector	1986	1987	1988
Manufacturing	22,636	30,654	35,320
Commerce	8,783	11,772	14,508
Government services	6,638	8,512	10,477
Financial services	6,223	8,430	10,396
Agriculture	3,779	4,902	5,660
Social services	3,156	4,199	5,200
Transportation	3,180	4,211	5,135
Construction	2,626	3,579	4,578
Utilities	1,692	2,352	2,389
Mining and quarrying	314	408	484
Other	3,283	3,987	3,420
Total	**62,310**	**83,006**	**97,567**

Taiwan has a very weak minerals resource base. The value of the output of the mining sector is insignificant by world standards, and limited to small quantities of various, low-unit-value industrial minerals, mostly limestone, marble, and dolomite. The value of the mining sector is inflated by the small amount of coal and natural gas and associated condensate domestically produced. These minerals represented only 4.6% of Taiwan's total supply of energy, equivalent to a 17-day energy supply. Data on the mining sector were as follows:

	1986	1987	1988
Average annual employment	32,000	30,000	27,000
Average monthly working hours	179	180	178
Average monthly earnings dollars	459	563	686

Taiwan is a prominent member of the world's trading community. Its commerce is well served by a highly developed transportation infrastructure for both domestic and foreign receipts and discharges. Data on Taiwan's freight movement were as follows, in thousand-ton-kilometers:

	1986	1987	1988
Air:			
Domestic	2,352	2,787	3,072
International	2,535,145	2,941,783	3,215,428
Total	**2,537,497**	**2,944,571**	**3,218,500**
Highway	9,359,410	10,586,420	11,340,330
Railway:			
East Line	277,202	334,457	65,429
West Line	1,988,271	2,064,635	2,112,769
Other	99,987	91,122	99,845
Total	**2,365,460**	**2,490,214**	**2,278,043**

Kaohsiung, Taiwan's largest port, accounted for 57% of the country's harbor freight traffic. Harbor freight movement was as follows, in thousand tons:

	1986	1987	1989
Loading			
International:			
Kaohsiung	8,000	8,612	8,868
Keelung	4,569	5,449	5,012
Hualien	1,909	2,022	2,291
Taichung and Su-Ao	1,822	2,003	2,526
Domestic:			
Kaohsiung	3,969	4,363	5,034
Keelung	131	127	127
Hualien	1,312	1,034	1,381
Taichung and Su-Ao	139	48	126
Unloading			
International:			
Kaohsiung	47,616	54,480	63,851
Keelung	9,314	11,870	14,018
Hualien	872	1,014	1,381
Taichung and Su-Ao	7,963	9,892	11,085
Other	5,016	5,758	6,451
Domestic:			
Kaohsiung	1,140	915	1,034
Keelung	2,403	2,066	2,823
Hualien	378	358	260
Taichung and Su-Ao	1,529	1,751	2,203

Aside from containerized shipments, which were the largest single class, other bulk freight loaded and discharged included cement, fertilizers, iron and steel, machinery and metal parts, mineral ores, and vehicles and vehicular parts.

The United States was Taiwan's largest trading partner, its largest export market, and its second largest import supplier. Shipments to the United States were valued at $26.4 billion, accounting for 44% of total exports. Imports from the United States were valued at $8.5 billion, representing 22% of total receipts. The Government of Taiwan drafted a Trade Action Plan to reduce the country's large surplus with the United States. Proposals in the plan include tariff reductions and removal of nontariff barriers. Taiwan imported 190,119 kilograms of gold bullion from the United States, valued at $2.8 billion. The U.S. Government views the purchase of gold bullion as nonmerchandise trade. Hence, exclusion of the bullion purchase from the total U.S. shipments exacerbate Taiwan's large trade surplus with the United States.

Negotiations on a copyright agreement between the United States and Taiwan began in 1987. The remaining disputed issues of the agreement were expected to be resolved in 1989. A bilateral patent and trademark agreement also was under consideration. Significant legal and enforcement problems exist in

Taiwan, despite the Government's willingness to improve the protection of intellectual property rights.

Production

Because Taiwan has a very weak mineral resource base, the value of the output of the mining sector was only $464.8 million or 0.4% of the country's GNP. By value, the most important mine output was natural gas, followed by coal. The domestic output of mineral fuels was significant only in that it provided close to 5% of the nation's supply of energy. Mine production of metal ore, which was for copper, ended early in the decade. In terms of tonnage and value, the output of carbonate minerals, followed by clays, dominated the remainder of the output of the domestic mining industry. The value of Taiwan's mine output was as follows, in thousand dollars, in decreasing order:

Natural gas	248,764
Coal	108,689
Limestone	37,288
Marble	29,839
Kaolin	19,554
Dolomite	6,440
Serpentine	6,104
Salt	4,721
Fire clay	2,948
Feldspar	449
Total	**464,796**

At yearend 1987, the prospecting and mining rights registered with the Taiwan Provincial Bureau of Mines were as follows, by number of claims and area, in hectares:

	Prospecting		Mining	
	Claim	Area	Claim	Area
Chiayi County	—	—	1	75
Hsinchu County	2	116	1	117
Hualien County	23	2,772	5	271
Ilan County	2	252	2	965
Kaohsiung County	—	—	3	81
Kaohsiung Municipality	—	—	2	16
Miaoli County	2	71	4	179
Nantou County	1	29	1	83
Tainan County	—	—	2	277
Taipei County	2	141	1	30
Taitung County	12	1,023	3	211
Total	**44**	**4,404**	**23**	**2,305**

There are no mining claims in the counties of Taoyuan, Taichung, Pingtung, and Penghu, in Keelung City, and Taipei Municipality. By kind of minerals, there was mining-right registration for gold, quartz crystal, clays, carbonate minerals, coal, natural gas, gem stones, and geothermal steam. All of the registrations for prospecting and mining rights were to private parties.

The large mineral- and metal-producing companies in Taiwan are state-owned enterprises. These included China Petrochemical Development Corp., China Steel Corp., Chinese Petroleum Corp., Kaohsiung Ammonium Sulfate Corp. Ltd., Taiwan Aluminium Corp., Taiwan Cement Corp., Taiwan Fertilizer Corp., Taiwan Metal Mining Corp., Taiwan Salt Works, and Tang Eng Iron Works Co. Ltd.

The quantity and value of domestic shipments of selected mining and manufacturing products were as follows, in metric tons and thousand dollars except as otherwise indicated:

		Quantity	Value
Metals:			
Aluminum, sheet		12,027	38,722
Copper, electrolytic		34,446	90,284
Gold	troy ounces	31,674	16,285
Iron and steel:			
Pig iron[1]		20,550	3,295
Ferroalloys:			
Feromanganese		25,223	13,925
Ferrosilicon		23,756	27,518
Ferrosilicomanganese		28,908	16,947
Other		4,241	6,208

Trade

The value of Taiwan's total trade increased to $110.37 billion. Exports were valued at $60.56 billion and imports at $49.81 billion, resulting in a trade surplus of $10.75 billion. The largest export destination was the United States with shipments valued at $23.42 billion, followed by Japan, $8.76 billion; Hong Kong, $5.58 billion; the Federal Republic of Germany, $2.34 billion; the United Kingdom, $1.90 billion; Singapore, $1.68 billion; Canada, $1.58 billion; the Netherlands, $1.51 billion; Australia, $1.36 billion; and France, $0.94 billion. These countries collectively accounted for 81% of the total value of shipments from Taiwan. The largest supplier of Taiwan's imports was Japan, with receipts valued at $14.87 billion, followed by the United States, $13.04 billion; the Federal Republic of Germany, $2.14 billion; Hong Kong, $1.93 billion; Australia, $1.34 billion; Saudi Arabia, $1.24 billion; Switzerland, $1.03 billion; and Canada, $0.96 billion. These countries collectively accounted for 73% of Taiwan's total receipts.

The largest export class was machinery and transportation equipment valued at $22.33 billion or 36.8% of the value of total shipments, followed by textile, apparel, and related goods, valued at $10.83 billion, comprising 17.8% of total exports. The minerals and metals export categories included metal products, valued at $3.49 billion;

		Quantity	Value
Metals—Continued:			
Iron and steel—Continued:			
Steel ingot[1]		828,550	218,599
Silver	troy ounces	435,408	5,284
Industrial minerals:			
Cement		14,236,487	1,086,877
Clays:			
Fire clay		50,241	1,229
Kaolin		78,038	2,076
Dolomite		418,347	6,026
Feldspar		17,469	934
Fertilizer materials:			
Ammonia, anhydrous		74,635	20,882
Ammonium sulfate		426,284	77,493
Calcium superphosphate		273,780	24,240
Nitrochalk		16,529	2,370
Urea		268,480	46,141
Other		463,146	96,495
Limestone		794,075	2,195
Marble:			
Crude		2,381,576	6,408
Dimension	cubic meters	149,541	10,088
Salt:			
Crude		15,617	662
Refined		228,583	40,371
Serpentine		326,529	6,082
Sulfur		88,997	8,813
Fuels and related materials:			
Carbon black		55,007	30,823
Coal		1,227,620	108,897
Natural gas	thousand cubic meters	1,099,809	236,394

[1] Excludes China Steel Corp.

base metals, $1.31 billion; chemicals, $1.59 billion; chemical products, $860 million; glass products, $33 million; and cement, $10 million. Altogether, these commodities accounted for 12.6% of the total value of exports. Imports of machinery and transportation equipment were valued at $16.53 billion, or 33.1%, of total receipts. Mineral-related imports included base metals, valued at $10.45 billion; metal products, $36 million; chemicals, $4.93 billion; chemical products, $2.32 billion; industrial mineral products, $31 million; and mineral ores, $30 million. These receipts accounted for 37.4% of total imports. Imports of fuels were coal, valued at $85 million, and crude oil, $2.22 billion.

Commodity Review

Metals.—There were no domestic mining operations for metal-bearing ores in Taiwan. The country's only primary metals industry is limited to copper and iron and steel, both of which utilize imported ore.

Aluminum.—Primary aluminum metal production by Taiwan Aluminium Corp. (Talco), a state-owned enterprise, ceased in 1982. The Government transferred Talco to the state-owned Taiwan Power Co. (Taipower), which continued Talco's rolling operations to produce sheet and foil from imported ingot. Imports of unwrought aluminum totaled 136,553 tons. The principal suppliers were Australia, 67,192 tons; Canada, 14,745 tons; New Zealand, 11,318 tons; and the Republic of South Africa, 10,295 tons. U.S. shipments to Taiwan were 7,508 tons, valued at $17.3 million. Imports of unwrought aluminum alloys were 56,851 tons, supplied principally by the United Arab Emirates, the Republic of South Africa, the United States, Australia, Bahrain, Canada, and New Zealand, in that order. U.S. shipments to Taiwan were 6,979 tons, valued at $17.4 million.

Copper.—Taiwan Metal Mining Corp. (TMMC), a state-owned enterprise, had its 50,000-ton-per-year copper smelter-refinery at Juifang. Because of the insolvency of the operation, the facilities were transferred to Taipower in 1987, which was to continue the production of copper and byproduct gold and silver for the next 10 years. Taiwan imported 118,023 tons of copper concentrate, primarily from Canada, accounting for 62,292 tons, and the Philippines, 22,817 tons. The remainder of the imports was from Chile, Mexico, India, and Turkey, in that order.

Iron and Steel.—China Steel Corp. (CSC), a state-owned enterprise, operated the country's only integrated iron and steel complex at Kaohsiung. CSC's annual production capacity of crude steel was 5.65 million tons. Tang Eng Iron Works, Ltd. (Tang Eng) a state-owned enterprise, specialized in stainless steel production. Taiwan Nickel Refinery Co. (TaiNickel) supplies Tang Eng with nickel metal for stainless steel production. Prior to CSC's existence, Taiwan's steel industry was composed

TABLE 10

TAIWAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1984	1985	1986	1987	1988[p]
METALS						
Copper: Metal, refined		48,436	46,734	50,439	46,961	43,333
Gold, primary	troy ounces	37,794	30,633	29,270	17,152	7,584
Iron and steel: Metal:						
Pig iron	thousand tons	3,360	3,429	3,740	[r]3,900	5,675
Ferroalloys:						
Ferromanganese		19,803	18,508	20,040	17,026	25,744
Ferrosilicomanganese		23,082	22,688	20,933	18,944	20,420
Ferrosilicon		20,714	17,272	14,007	7,058	10,527
Steel, crude	thousand tons	5,224	5,326	5,679	5,949	8,313
Lead, refinery, secondary[e]		44,300	[r]48,700	[r]53,500	64,400	66,000
Nickel, refined		1,100	2,100	8,500	8,200	8,200
Silver, primary	troy ounces	364,274	366,078	405,521	315,382	268,416
INDUSTRIAL MINERALS						
Asbestos		1,355	625	—	—	—
Cement, hydraulic	thousand tons	14,234	14,418	14,806	15,663	17,281
Clays:						
Fire clay		52,479	63,446	64,652	76,005	131,370
Kaolin		79,411	76,605	63,228	67,525	81,879
Feldspar		15,452	11,055	26,290	28,116	19,101
Gypsum: Precipitated		1,882	2,199	2,247	1,378	2,438
Lime		117,496	105,132	109,690	105,005	105,701
Mica		304	114	774	787	4,387
Nitrogen: N content of ammonia		268,427	206,781	265,248	243,275	277,741
Pyrite, gross weight		—	8	10	—	—
Salt, marine		218,491	173,898	136,078	99,943	111,341
Sodium compounds, n.e.s.:						
Caustic soda		350,527	386,505	365,913	378,244	332,698
Carbonate (soda ash)		107,210	112,018	133,358	127,332	126,828
Stone:						
Dolomite	thousand tons	258	231	258	340	448
Limestone	do.	12,936	12,722	12,462	12,407	13,653
Marble	do.	9,542	10,259	10,603	11,062	11,615
Serpentine	do.	123	208	234	253	328
Sulfur:						
S content of pyrite		—	4	5	—	—
Byproduct, all sources		28,705	42,949	62,980	89,082	86,441
Total		**28,705**	**42,953**	**62,985**	**89,082**	**86,441**
Talc		18,680	17,560	21,552	22,102	21,603

See footnotes at end of table.

TABLE 10—Continued

TAIWAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1984	1985	1986	1987	1988[p]
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		39,842	43,264	48,363	53,559	54,302
Coal, bituminous	thousand tons	2,011	1,858	1,725	1,499	1,225
Coke	do.	141	132	148	118	97
Gas, natural:						
Gross[e]	million cubic feet	49,000	44,000	40,000	41,000	45,000
Marketed	do.	44,698	39,731	36,111	37,325	41,087
Petroleum:						
Crude	thousand 42-gallon barrels	855	743	660	—	—
Refinery products:						
Gasoline	do.	17,518	25,408	18,128	24,480	[e]22,500
Kerosene	do.	61	282	956	547	[e]600
Distillate fuel oil	do.	21,972	23,852	19,480	25,581	[e]26,000
Residual fuel oil	do.	56,426	56,080	53,591	51,622	[e]52,000
Lubricants	do.	951	856	887	1,887	[e]2,000
Asphalt	do.	2,311	2,999	3,195	2,291	[e]2,300
Other[2]	do.	8,517	9,916	3,478	4,835	[e]4,800
Refinery fuel, losses and not reported[e,3]	do.	27,000	30,000	25,000	21,680	[e]22,000
Total	**do.**	**134,756**	**149,393**	**125,375**	**132,923**	**[e]132,200**

[e] Estimated. [p] Preliminary. [r] Revised.
[1] Includes data available through June 8, 1989.
[2] Naphtha, solvent oil, and base oil.
[3] Includes liquefied petroleum gas and jet fuel.

of numerous small operations utilizing scrap metal and ship plate generated by 140 shipbreaking companies in Kaohsiung Harbor. In 1986, Taiwan's shipbreaking reached a peak of 3.69 million light displacement tons of demolition. However, during that year, oil in a derelict tanker exploded in the scrapping yard as it was being cut, killing 14 workers and causing a huge fire. Lacking Government backing and encouragement, the industry has drastically contracted since that incident. At yearend, there were only 37 berths at Kaohsiung for breaking; on March 31, 1989, one of the shipbreaking sites at the Tajen zone was to close, leaving only a total of 13 shipbreaking berths at Kaohsiung. Consequently, the small steel operations were almost extinct, following the demise of the shipbreaking industry. CSC accounted for 71.4% of the country's total production of crude steel. The remainder of the output was by small operations such as Hai Kwang Steel Co., Lung Chin Steel Co., Li Chong Co., and Tung Ho Steel Enterprise Inc., all using electric furnaces.

CSC had planned a fourth-stage expansion at Kaohsiung to raise its annual production capacity to 8 million tons of crude steel. While the expansion is likely, it probably will be an overseas venture. There is a severe space constraint at Kaohsiung. Limited water is available for industrial use, and limited electric power is available to companies consuming more than 2,000 kilowatts. Air pollution was particularly bad in and around Kaohsiung. There is strong local opposition to CSC's expansion due to increased environmental degradation. The space being vacated by the shipbreaking operations was to be used to expand harbor facilities for containerized shipping. The company's in-house feasibility study considered the United States, Australia, Brazil, and the Republic of South Africa as possible host countries for CSC's added capacity.

Taiwan's steel industry was dependent on foreign sources for raw materials. Imports of iron ore totaled 8.5 million tons and were primarily from Australia, Brazil, and the Republic of South Africa, in that order. Receipts of manganese ore were 170,942 tons and were primarily from the Republic of South Africa, Australia, and Gabon, in order of tonnage. Imports of ferrous scrap metal were 1.3 million tons; principal suppliers were the United States,

TABLE 11

TAIWAN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Destinations, 1987	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	—	2	—	Mainly to Hong Kong.
Oxides and hydroxides	6,284	3,721	—	Republic of Korea 1,330; Panama 1,250; Peru 800.
Metal including alloys:				
Scrap	3,096	7,969	5	Japan 7,926; Hong Kong 37.
Unwrought	12,504	17,254	56	Japan 13,445; Republic of Korea 2,526; Thailand 865.
Semimanufactures	18,247	23,682	1,609	Hong Kong 12,147; Japan 5,268; Singapore 2,780.
Antimony:				
Oxides	5	64	—	Netherlands 39; Japan 20; Hong Kong 3.
Metal including alloys, waste and scrap	—	3	3	
Arsenic: Oxides and acids	—	1	—	All to Philippines.
Beryllium: Metal including alloys, all forms	9	12	1	Japan 11.
Chromium: Oxides and hydroxides kilograms	—	717	—	Thailand 400; Indonesia 317.
Cobalt: Oxides and hydroxides do.	1,000	150	—	All to Malaysia.
Columbium and tantalum: Metal including alloys all forms: Tantalum	5	22	18	Japan 2.
Copper:				
Ore and concentrate	—	(2)	(2)	
Sulfate	270	250	—	Singapore 80; New Zealand 51; Malaysia 50.
Metal including alloys:				
Scrap	6,186	10,073	108	Japan 6,730; Republic of Korea 1,357.
Unwrought	49	665	9	Thailand 361; Hong Kong 168; Japan 90.
Semimanufactures	17,608	31,653	1,009	Hong Kong 9,044; Republic of Korea 8,845; Singapore 2,780.
Gold:				
Waste and sweepings value, thousands	$608	$65	$65	
Metal including alloys, unwrought and partly wrought troy ounces	(2)	3,858	3,858	
Iron and steel:				
Iron ore and concentrate excluding roasted pyrite	1	166	(2)	Hong Kong 108; Japan 37; Philippines 11.
Metal:				
Scrap	280,941	97,755	2,334	Thailand 50,711; Japan 43,372.
Pig iron, cast iron, related materials	4,766	2,877	913	Australia 543; Japan 398.
Ferroalloys:				
Ferrochromium	2	3	—	Philippines 2; Thailand 1.
Ferromanganese	60	100	—	All to Hong Kong.
Ferrosilicon	458	208	—	Japan 117; Republic of Korea 80.
Silicon metal	2	3	(2)	Hong Kong 1; India 1; Singapore 1.
Unspecified	915	1,448	29	Hong Kong 611; Japan 538; Republic of Korea 216.
Steel, primary forms	86,250	123,269	35	Japan 77,968; Philippines 17,391; West Germany 16,671.

See footnotes at end of table.

TABLE 11—Continued

TAIWAN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
METALS—Continued					
Iron and steel—Continued					
Metal—Continued					
Semimanufactures:					
Bars, rods, angles, shapes, sections		739,827	272,058	59,204	Hong Kong 43,775; Sudan 31,762.
Universals, plates, sheets		401,274	439,269	53,528	Japan 217,940; Thailand 35,612.
Hoop and strip		2,571	3,804	NA	Japan 1,964; Thailand 506; Singapore 194.
Rails and accessories		593	1,245	328	Thailand 210; Canada 10.
Wire		39,343	39,627	2,771	Republic of Korea 18,545; Indonesia 7,488; Thailand 3,025.
Tubes, pipes, fittings		231,313	187,299	87,729	Saudi Arabia 44,177; Sudan 9,498.
Castings and forgings, rough		9,212	9,895	7,097	Hong Kong 990; Japan 595.
Lead:					
Ore and concentrate		—	(2)	—	All to Hong Kong.
Oxides		68	63	—	Thailand 40; Indonesia 18; Japan 5.
Metal including alloys:					
Scrap		100	1	—	All to Philippines.
Unwrought		23,473	16,031	121	Republic of Korea 5,399; Japan 4,456; Philippines 2,585.
Semimanufactures		182	345	47	Japan 222; Canada 16.
Magnesium: Metal including alloys:					
Scrap		525	522	7	Japan 410; Netherlands 104.
Unwrought		12	19	16	Hong Kong 1; Thailand 1.
Semimanufactures		35	52	52	
Manganese:					
Ore and concentrate: Metallurgical-grade		31	275	—	Republic of Korea 170; Hong Kong 100.
Oxides		29	82	1	Hong Kong 64; Philippines 17.
Molybdenum: Metal including alloys:					
Scrap	kilograms	—	188	—	All to West Germany.
Semimanufactures	do.	768	19,930	5,044	Saudi Arabia 14,836; Thailand 46.
Nickel:					
Matte and speiss		—	53	20	Japan 32.
Metal including alloys:					
Scrap		1,506	2,180	44	Japan 1,698; United Kingdom 236; Canada 165.
Unwrought		382	1,140	3	Japan 928; Australia 204.
Semimanufactures		26	19	6	Republic of Korea 7; Thailand 4.
Platinum-group metals: Metals including alloys, unwrought and partly wrought	troy ounces	77,515	26,974	7,459	Japan 9,935; Switzerland 3,729.
Selenium, elemental	kilograms	—	20	—	All to Indonesia.
Silicon, high-purity	do.	129	2,069	—	Republic of Korea 1,631; Singapore 360; Thailand 55.

See footnotes at end of table.

TABLE 11—Continued

TAIWAN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
METALS—Continued					
Silver:					
Waste and sweepings[3]	value, thousands	$1,079	$3,296	$2,178	Switzerland $457; Hong Kong $336.
Metal including alloys, unwrought and partly wrought	troy ounces	39,995	17,490	96	Hong Kong 11,896; Singapore 5,305.
Tin: Metal including alloys:					
Scrap		(r)	16	—	All to Japan.
Unwrought		18	40	(2)	Saudi Arabia 10; United Kingdom 10; Philippines 9.
Semimanufactures		623	739	36	Hong Kong 345; Japan 163.
Titanium:					
Oxides		395	11	(2)	Nigeria 6; Indonesia 2; Australia 1.
Metal including alloys: Semimanufactures	kilograms	—	43	—	All to Singapore.
Tungsten: Metal including alloys:					
Scrap		6	6	—	Japan 5; Netherlands 1.
Unwrought		—	3	—	All to Japan.
Semimanufactures		2	29	1	Republic of Korea 26.
Uranium and thorium: Metal including alloys, all forms		298	315	113	Belgium-Luxembourg 38; United Kingdom 27.
Zinc:					
Oxides		2,837	4,596	359	Japan 3,499; Thailand 263.
Blue powder		14	68	8	Philippines 60.
Metal including alloys:					
Scrap		79	40	3	Netherlands 18; Belgium-Luxembourg 11.
Unwrought		24	200	24	Japan 72; Singapore 40; Indonesia 27.
Semimanufactures		888	1,045	729	Jordan 60; Hong Kong 55.
Zirconium: Oxides	kilograms	—	2	—	All to Hong Kong.
Other:					
Ores and concentrates		264	467	(2)	Republic of Korea 200; Japan 162; Thailand 91.
Ashes and residues		10,246	2,711	27	Japan 1,992; India 249; Netherlands 164.
Base metals including alloys, all forms		385	806	329	Japan 119; Belgium-Luxembourg 86.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		52	76	1	Thailand 26; Republic of South Africa 22.
Artificial: Corundum		390	275	—	Japan 256; Republic of South Africa 16; Hong Kong 2.
Dust and powder of precious and semiprecious stones including diamond		17	71	2	Singapore 64; New Zealand 3.
Grinding and polishing wheels and stones		3,182	4,378	1,610	Hong Kong 416; Thailand 334.
Asbestos, crude		(2)	27	—	Malaysia 26; Japan 1.

See footnotes at end of table.

TABLE 11—Continued

TAIWAN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Boron materials:					
Crude natural borates		—	2	—	All to Indonesia.
Oxides and acids	kilograms	500	200	—	Ivory Coast 100; Philippines 75; United Arab Emirates 25.
Cement	thousand tons	3,545	3,025	21	Hong Kong 1,154; Japan 1,118; Singapore 603.
Chalk		600	1,350	—	All to Indonesia.
Clays, crude:					
Bentonite		257	20	—	Hong Kong 19; Malaysia 1.
Fire clay		20	3	—	All to Indonesia.
Kaolin		1	331	—	Philippines 315; Hong Kong 9; Malaysia 5.
Unspecified		718	954	—	Philippines 584; Indonesia 100; Republic of Korea 62.
Diamond:					
Natural:					
Gem, not set or strung	thousand carats	12,340	29,660	22,735	Canada 4,795; Japan 995.
Industrial stones	do.	12,440	32,060	7,155	Spain 13,670; Hong Kong 5,315.
Synthetic[4]					
Gem, not set or strung	do.	8,190	42,965	9,135	Saudi Arabia 25,125; United Kingdom 4,380.
Industrial stones	do.	328,180	656,260	800	Thailand 422,678; Republic of Korea 159,895; Austria 28,300.
Diatomite and other infusorial earth		34	731	—	Japan 535; Malaysia 178; Philippines 18.
Feldspar, fluorspar, related materials		166	203	(2)	Philippines 115; Indonesia 60; Malaysia 23.
Fertilizer materials:					
Crude, n.e.s.		393	887	—	Belgium-Luxembourg 532; Republic of South Africa 220; Japan 121.
Manufactured:					
Ammonia		17	93	—	Japan 67; Hong Kong 19; United Arab Emirates 7.
Nitrogenous		905	10,601	1	Philippines 10,000; Japan 600.
Phosphatic		4,129	4,108	—	Fiji 2,500; Malaysia 1,500; Japan 108.
Potassic		25,855	34,511	—	Japan 13,418; Hong Kong 11,718; Syria 3,700.
Unspecified and mixed		5,368	9,746	—	Japan 6,194; Thailand 3,100; Hong Kong 428.
Graphite, natural		204	178	—	Philippines 82; Republic of Korea 45; Indonesia 36.
Gypsum and plaster		726	741	15	Indonesia 504; India 100; Philippines 63.
Iodine	kilograms	1,400	3,350	—	Indonesia 2,000; Philippines 1,050.
Lime		13	27	(2)	Japan 18; Philippines 4; Republic of South Africa 2.
Magnesium compounds: Oxides and hydroxides		505	100	—	All to Indonesia.
Meerschaum, amber, jet		5	107	(2)	Malaysia 70; Japan 16; Singapore 6.
Mica:					
Crude including splittings and waste		198	394	—	New Zealand 179; Japan 156; United Kingdom 34.
Worked including agglomerated splittings		80	152	(2)	Japan 104; Hong Kong 18; United Kingdom 17.

See footnotes at end of table

TABLE 11—Continued

TAIWAN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Pigments, mineral:					
Natural, crude		—	1	1	
Iron oxides and hydroxides, processed		35	134	10	Indonesia 81; Malaysia 20; Thailand 13.
Precious and semiprecious stones other than diamond:					
Natural	kilograms	131,696	405,230	34,023	Hong Kong 234,449; Thailand 49,145.
Synthetic	do.	43,708	53,876	17,975	Italy 9,881; Hong Kong 9,213.
Salt and brine		1,950	3,418	—	Mainly to Hong Kong.
Sodium compounds, n.e.s.:					
Carbonate, manufactured		259	3	—	Sri Lanka 2.
Sulfate, manufactured		23,984	20,670	—	Japan 9,847; Republic of Korea 5,000; Thailand 2,398.
Stone, sand and gravel:					
Dimension stone:					
Crude and partly worked		12,194	7,273	161	Japan 4,974; U.S. Trust Territory 1,261; Hong Kong 412.
Worked		30,434	24,561	3,363	Saudi Arabia 14,699; Japan 11,291.
Dolomite, chiefly refractory-grade		82,116	219,630	—	Japan 203,498; Saudi Arabia 14,870; Indonesia 1,262.
Gravel and crushed rock		170,932	252,098	23	Japan 240,116; Malaysia 8,370; Philippines 2,026.
Limestone other than dimension		9,094	3,764	—	Japan 3,262; Philippines 500.
Quartz and quartzite		13	13	—	Japan 10; Malaysia 3.
Sand other than metal-bearing		309,555	414,320	(2)	Japan 404,521; U.S.Trust Territory 6,576; Philippines 628.
Sulfur:					
Elemental:					
Crude including native and byproduct		1,192	599	—	Indonesia 295; Philippines 140; Thailand 84.
Colloidal, precipitated, sublimed		153	274	—	Philippines 180; Indonesia 48; Australia 26.
Sulfuric acid		104	216	12	Hong Kong 51; Republic of Korea 45; Japan 23.
Talc, steatite, soapstone, pyrophyllite		695	357	—	Indonesia 139; Republic of South Africa 73; Singapore 58.
Other:					
Crude		5,328	7,988	190	Philippines 3,745; Thailand 2,304; Singapore 292.
Slag and dross, not metal-bearing		80,572	141,974	NA	Philippines 55,507; Japan 53,521; Singapore 32,064.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		80	2	—	All to Singapore.
Carbon:					
Carbon black		9,746	13,735	—	Indonesia 8,735; Thailand 2,015; Malaysia 1,592.
Gas carbon		277	6,363	—	Japan 4,648; Indonesia 1,100.

See footnotes at end of table.

TABLE 11—Continued

TAIWAN: EXPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Destinations, 1987	
				United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued					
Coal, all grades including briquets		—	1	—	All to New Zealand.
Coke and semicoke		13,257	9,181	—	Japan 4,821; Indonesia 3,050; Malaysia 400.
Peat including briquets and litter		256	220	—	All to Japan.
Petroleum refinery products:					
Liquefied petroleum gas	42-gallon barrels	—	(2)	—	All to Panama.
Gasoline, motor	do.	9	23,630	—	Panama 3,060; unspecified 20,570.
Mineral jelly and wax	do.	39	787	(2)	Hong Kong 331; Japan 205; Philippines 126.
Kerosene and jet fuel	thousand 42-gallon barrels	9,785	6,750	411	Japan 7,338; Singapore 3,295; U.S. Trust Territory 1,529.
Distillate fuel oil	do.	8,246	5,643	—	Japan 223; Panama 55; Singapore 37.
Lubricants	do.	r776	839	329	Japan 137; United Arab Emirates 64.
Nonlubricating oils	do.	3	109	NA	Republic of Korea 50; Japan 38; India 12.
Residual fuel oil	do.	—	(2)	—	NA.
Bituminous mixtures	do.	1	(2)	—	Mainly to U.S. Trust Territory.
Petroleum coke	do.	908	727	2	Japan 492; Hong Kong 111; Indonesia 90.

[r] Revised. NA Not available.
[1] Table prepared by G. Jacarepaqua and Audrey D. Wilkes.
[2] Less than 1/2 unit.
[3] May include other precious metals.
[4] Data presented are as reported by the Inspectorate General of Customs of Taiwan, but the material listed is believed to be synthetic material other than diamond.

Japan, and Hong Kong. In addition, scrap metal was produced from shipbreaking. There were 167 vessels, weighing 1,026,763 tons, which were imported for scrapping. The principal suppliers were the United States, 50 vessels; Japan, 39; Spain, 13; and the Federal Republic of Germany, 10.

Industrial Minerals.—The production of industrial minerals in Taiwan is by Government-owned and privately owned operations for a limited array of minerals. Salt was produced from evaporation ponds, principally around Tainan; by the Taiwan Salt Works. This Government-owned enterprise, also operates facilities in Chiayi and Kaohsiung. Sulfur was recovered as a byproduct by China Petrochemical Development Corp. at its refineries in Ilan, Kaohsiung, and Taoyuan. All of the output of fine construction aggregate was by Government operations at Tainan and Taoyuan. A nearly equal quantity of dolomite was quarried by Government and private operations in Hualian and Taipei Counties. Most of the limestone and marble output was by private companies. Marble was quarried in Hualian and Ilan Counties, and limestone in Chiayi, Hualin, Hsinchu, Kaohsiung, Tainan, and Taitung. All of the output of china and fire clay, semiprecious gem stones, feldspar, mica, pyrite, quartz crystal, serpentine, and talc was by privately owned operations; the quantities produced of each are insignificant in terms of world standards. China clay was from mine operations in Hualien, Ilan, Keelung, Miaoli, Nantou, Taipei, and Taitung; fire clay in Hsinchu, Ilan, Keelung, Miaoli, Nantou, and Taipei; gem stones in Hualien and Taitung; feldspar in Hualien and Ilan; mica in Hualien, Ilan, and Taitung; pyrite in Taipei; quartz crystal in Hualien, Ilan, Miaoli, and Nantou; serpentine in Hualien and Taitung; and talc in Hualien and Ilan.

Mineral Fuels.—Taiwan has a very weak resource base for fossil fuels. Mine output of coal has declined annually since 1980 and was only 1.2 million tons in 1988. All coal production was by privately owned operations in Hsinchu, Keelung, Miaoli, and Taipei. Approximately 1.2 billion cubic meters of natural gas and approximately 879,000 42-gallon barrels of associated condensate were produced from wells in Hsinchu and Miaoli by the Chinese Petroleum Corp. Less than 25% of Taiwan's

TABLE 12

TAIWAN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Sources, 1987	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	47,261	36,235	(2)	Malaysia 35,035; India 700; Japan 400.
Oxides and hydroxides	5,725	12,103	219	Japan 8,951; Australia 2,258.
Metal including alloys:				
Scrap	13,055	23,211	16,167	United Kingdom 1,204; Australia 804.
Unwrought	155,956	195,095	9,541	Australia 78,298; Republic of South Africa 29,181; Canada 26,011.
Semimanufactures	32,440	48,631	3,411	Japan 19,865; Australia 8,082; West Germany 3,947.
Antimony:				
Oxides	765	1,079	90	France 472; Japan 148; Malaysia 100.
Metal including alloys:				
Unwrought	74	415	(2)	Thailand 352; West Germany 28.
Waste and scrap	3	203	—	All from Australia.
Arsenic: Oxides and acids	563	665	—	France 631; Republic of Korea 34.
Beryllium: Metal including alloys, all forms	1	1	(2)	Mainly from Japan.
Cadmium: Oxides and hydroxides	476	340	—	Republic of Korea 272; Belgium-Luxembourg 67.
Chromium:				
Ore and concentrate	19,048	20,899	—	Republic of South Africa 20,819; Netherlands 80.
Oxides and hydroxides	2,881	3,256	347	Japan 1,534; West Germany 748.
Cobalt: Oxides and hydroxides	66	98	1	Belgium-Luxembourg 76; United Kingdom 13.
Columbium and tantalum: Metal including alloys, all forms: Tantalum kilograms	37	665	28	Japan 637.
Copper:				
Ore and concentrate	179,704	153,155	10,804	Mexico 47,197; Canada 47,047; Chile 24,883.
Matte and speiss including cement copper	28	7	—	Hong Kong 5; Japan 1.
Sulfate	490	666	15	Japan 548; Australia 43.
Metal including alloys:				
Scrap	42,508	49,693	26,630	Hong Kong 4,926; Japan 4,865.
Unwrought	109,476	166,902	2,862	Chile 48,004; Philippines 42,250; Japan 36,528.
Semimanufactures	58,075	81,080	4,767	Japan 54,826; Republic of Korea 5,789; West Germany 5,350.
Gold:				
Bullion thousand troy ounces	731	2,663	851	Republic of South Africa 726; United Kingdom 535.
Metal including alloys, unwrought and partly wrought do.	866	1,117	102	Japan 1,007.
Iron and steel:				
Iron ore and concentrate excluding roasted pyrite thousand tons	5,358	6,141	(2)	Australia 3,511; Brazil 2,237; Republic of South Africa 230.
Pyrite, roasted	9,460	3	—	All from Japan.

See footnotes at end of table

TABLE 12—Continued

TAIWAN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Sources, 1987	
			United States	Other (principal)
METALS—Continued				
Iron and steel—Continued				
Metal:				
Scrap	1,225,472	943,592	560,083	Japan 144,296; Netherlands 67,394.
Pig iron, cast iron, related materials	319,790	643,976	1,207	Brazil 566,276; Republic of South Africa 40,448; Japan 28,391.
Ferroalloys:				
Ferrochromium	29,886	15,904	32	Republic of South Africa 15,668; Japan 44.
Ferromanganese	8,936	18,865	—	Republic of South Africa 17,644; Japan 984; Italy 76.
Ferrosilicon	11,894	19,406	120	Republic of South Africa 8,644; Norway 5,993; Philippines 1,662.
Silicon metal	2,683	3,256	2	Norway 1,357; Canada 1,081; Japan 511.
Unspecified	824	887	13	United Kingdom 289; Japan 142; Brazil 106.
Steel, primary forms	600,655	1,363,772	28,881	Japan 382,712; Republic of South Africa 361,195; Brazil 140,113.
Semimanufactures:				
Bars, rods, angles, shapes, sections	434,604	733,722	8,291	Japan 516,851; United Kingdom 42,316; Republic of Korea 30,946.
Universals, plates, sheets	1,286,764	1,690,949	38,830	Japan 1,320,067; Canada 115,392; Republic of South Africa 68,741.
Hoop and strip	42,041	44,329	2,522	Japan 37,415; West Germany 1,542.
Rails and accessories	22,103	28,530	10	Republic of South Africa 13,017; Australia 6,645; Republic of Korea 4,781.
Wire	26,749	33,305	1,581	Japan 17,595; Republic of Korea 9,171; Republic of South Africa 2,220.
Tubes, pipes, fittings	87,992	148,153	603	Japan 90,308; Republic of South Africa 22,685; West Germany 20,628.
Castings and forgings, rough	1,851	2,289	34	Japan 1,964; France 188; Republic of Korea 45.
Lead:				
Ore and concentrate	—	171	—	All from Indonesia.
Oxides	2,935	3,095	14	Australia 2,683; France 200; West Germany 152.
Metal including alloys:				
Scrap	89,536	79,652	20,299	Australia 15,605; Saudi Arabia 10,370.
Unwrought	16,154	20,947	2,982	Australia 9,114; Japan 2,793.
Semimanufactures	19	29	10	West Germany 10; Japan 5.
Magnesium: Metal including alloys:				
Unwrought	922	1,011	175	Norway 668; France 113.
Semimanufactures	29	77	69	West Germany 3; Canada 2.
Manganese:				
Ore and concentrate: Metallurgical-grade	119,241	131,704	—	Republic of South Africa 72,258; Australia 30,421; Gabon 28,685.

See footnotes at end of table.

TABLE 12—Continued

TAIWAN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
METALS—Continued					
Manganese—Continued:					
Oxides		2,625	3,516	3	India 1,523; Japan 929; Republic of South Africa 528.
Metal including alloys, all forms		35	54	10	West Germany 17; United Kingdom 16.
Mercury	76-pound flasks	282	247	90	Japan 87; Spain 63.
Molybdenum: Metal including alloys:					
Scrap		—	2	1	Hong Kong 1.
Unwrought		—	1	1	Japan[2]
Semimanufactures		85	102	69	West Germany 22; Japan 9.
Nickel:					
Matte and speiss		11,514	11,256	—	All from Canada.
Metal including alloys:					
Scrap		1,223	383	259	Netherlands 105; West Germany 10.
Unwrought		6,535	6,364	5	Canada 3,939; Norway 1,621; Zimbabwe 274.
Semimanufactures		691	687	80	Canada 214; Japan 99; Australia 82.
Platinum-group metals: Metals including alloys, unwrought and partly wrought	thousand troy ounces	19	[3]3,884	9	Japan 3,859; Australia 11.
Rare-earth metals including alloys, all forms		62	81	1	Japan 75.
Selenium, elemental		27	47	(2)	Malaysia 30; United Kingdom 8; Japan 7.
Silicon, high-purity		[r]15	23	10	West Germany 7; Japan 6.
Silver:					
Ore and concentrate[4]	value, thousands	$78	$75	$8	United Kingdom $67.
Waste and sweepings[4]	do.	$61	$16	$10	Hong Kong $6.
Metal including alloys, unwrought and partly wrought	thousand troy ounces	2,403	3,200	341	Japan 714; Australia 713; West Germany 499.
Tin:					
Oxides		9	24	—	West Germany 14; Japan 5; United Kingdom 3.
Metal including alloys:					
Scrap		7	14	—	Singapore 9; Japan 4.
Unwrought		4,513	4,410	2	Malaysia 3,058; Indonesia 707; Thailand 319.
Semimanufactures		421	684	10	Hong Kong 497; Singapore 106; Japan 46.
Titanium:					
Oxides		13,187	14,481	621	Japan 6,369; West Germany 4,198; Australia 1,516.
Metal including alloys: Semimanufactures		26	26	1	United Kingdom 19; Japan 6.
Tungsten: Metal including alloys:					
Scrap		7	28	4	Japan 24.
Unwrought		—	(2)	(2)	
Semimanufactures		49	89	22	Japan 57; United Kingdom 4.
Uranium and thorium:					
Oxides and other compounds		38	70	24	France 26; Norway 11.
Metal including alloys, all forms	kilograms	18	82	—	Netherlands 77.

See footnotes at end of table.

TABLE 12—Continued

TAIWAN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
METALS—Continued					
Zinc:					
Ore and concentrate	value, thousands	—	$3	—	Mainly from Netherlands.
Oxides		326	488	55	Japan 224; Republic of Korea 94.
Blue powder		206	262	(2)	West Germany 145; Republic of Korea 54; Japan 26.
Metal including alloys:					
Scrap		69,369	110,814	80,215	West Germany 6,862; Canada 6,087.
Unwrought		79,000	84,118	524	Australia 34,677; Japan 13,498; Canada 11,805.
Semimanufactures		927	776	3	Japan 564; France 85; United Kingdom 51.
Zirconium: Oxides		1,519	464	38	Japan 117; France 84; Australia 80.
Other:					
Ores and concentrates		35,057	37,732	594	Australia 20,255; Malaysia 13,026; Republic of South Africa 2,109.
Ashes and residues		28,021	50,251	6,928	Japan 26,283; Australia 6,051.
Base metals including alloys, all forms		536	701	106	Hong Kong 187; Japan 145.
INDUSTRIAL MINERALS					
Abrasives, n.e.s.:					
Natural: Corundum, emery, pumice, etc.		4,533	21,389	720	Indonesia 16,590; Japan 1,369; Netherlands 1,114.
Artificial:					
Corundum		18,218	20,130	82	Japan 10,117; Hong Kong 7,169; Austria 1,085.
Silicon carbide including boron carbide		5,495	7,037	96	Japan 1,985; Hong Kong 1,674; Netherlands 1,224.
Dust and powder of precious and semiprecious stones including diamond	kilograms	891	1,417	227	Japan 660; Ireland 525.
Grinding and polishing wheels and stones		1,090	1,636	169	Japan 659; Italy 534.
Asbestos, crude		39,735	36,469	1,296	Canada 17,745; Republic of South Africa 11,955; Greece 2,000.
Barite and witherite		6,636	1,586	—	All from Thailand.
Boron materials:					
Crude natural borates		2,345	2,485	110	Japan 1,386; Switzerland 880.
Oxides and acids		2,019	2,342	1,975	Italy 328; Japan 38.
Bromine	kilograms	121	796	—	Israel 630; Japan 93; West Germany 57.
Cement		10,053	41,796	26	Indonesia 13,202; Hong Kong 9,550; Japan 9,179.
Clays, crude:					
Bentonite		18,624	20,051	16,361	India 1,400; Republic of South Africa 1,368.
Fire clay		632	2,693	—	India 1,000; Republic of South Africa 828; Japan 749.
Kaolin		120,134	156,723	62,789	Indonesia 33,586; Malaysia 16,709.
Unspecified		158,808	205,173	11,359	Hong Kong 121,327; Japan 34,102; India 23,727.
Cryolite and chiolite		108	68	—	Denmark 44; Japan 19; Australia 5.
Diamond:					
Natural:					
Gem, not set or strung	thousand carats	1,250	r25	—	France 15; Belgium-Luxembourg 10.
Industrial stones	do.	1,580	5,085	—	Japan 5,005; Belgium-Luxembourg 80.
Synthetic:					
Gem, not set or strung	do.	1,155	240	180	Ireland 55; Japan 5.
Industrial stones	do.	820	r560	50	Ireland 260; Japan 250.

See footnotes at end of table.

TABLE 12—Continued

TAIWAN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	1986	1987	Sources, 1987	
			United States	Other (principal)
INDUSTRIAL MINERALS—Continued				
Diatomite and other infusorial earth	4,296	4,623	3,399	West Germany 527; Japan 523.
Feldspar, fluorspar, related materials	158,131	224,733	854	Thailand 92,170; Hong Kong 57,603; Philippines 18,959.
Fertilizer materials:				
Crude, n.e.s.	1,732	181	14	Norway 79; France 42.
Manufactured:				
Ammonia	155,287	153,626	42,847	Indonesia 54,469; Qatar 18,125.
Nitrogenous	122,131	110,540	—	Saudi Arabia 74,641; Canada 18,958; Republic of Korea 5,493.
Phosphatic	110	202	2	Republic of South Africa 200.
Potassic	212,492	178,217	(2)	Canada 70,050; Jordan 54,570; Israel 41,549.
Unspecified and mixed	2,202	18,732	11,352	Japan 2,201; Republic of South Africa 2,044.
Graphite, natural	8,513	8,390	(2)	Republic of Korea 5,844; Zimbabwe 920; Sri Lanka 612.
Gypsum and plaster	401,118	185,846	714	Thailand 148,010; Japan 29,087; Australia 7,698.
Iodine	23	33	1	Japan 32.
Lime	20	17	—	Mainly from Japan.
Magnesium compounds: Oxides and hydroxides	37,215	38,113	234	India 15,295; Japan 9,816; Malaysia 7,280.
Meerschaum, amber, jet	3	43	—	Philippines 34; Hong Kong 5; Thailand 4.
Mica:				
Crude including splittings and waste	445	823	12	Malaysia 392; India 192; Thailand 150.
Worked including agglomerated splittings	192	268	14	Japan 187; Belgium-Luxembourg 32; India 30.
Phosphates, crude	330,763	361,188	—	Jordan 278,210; Morocco 49,563; Israel 23,480.
Phosphorus, elemental	2,899	2,677	209	Republic of South Africa 1,102; Japan 561; Netherlands 418.
Pigments, mineral:				
Natural, crude	5	38	2	Austria 36.
Iron oxides and hydroxides, processed	22,397	35,667	1,175	Japan 26,354; West Germany 1,951; Austria 1,602.
Potassium salts, crude	—	22	—	All from West Germany.
Precious and semiprecious stones other than diamond:				
Natural	7,616	6,527	89	Brazil 2,671; Republic of South Africa 2,372.
Synthetic	10	13	3	Japan 6; Belgium-Luxembourg 2.
Pyrite, unroasted	2	17	—	All from Japan.
Salt and brine	859,515	596,704	(2)	Australia 592,361; Japan 4,223.
Sodium compounds, n.e.s.:				
Carbonate, manufactured	31,100	49,846	43,820	Kenya 5,000; Australia 934.
Sulfate, manufactured	2,955	1,404	218	Thailand 920; West Germany 262.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	66,742	115,940	148	Republic of Korea 22,726; India 21,561; Spain 17,867.
Worked	432	1,320	3	Italy 800; Spain 292; Republic of South Africa 86.
Dolomite, chiefly refractory-grade	3,340	1,923	116	United Kingdom 1,617; Japan 76.

See footnotes at end of table.

TABLE 12—Continued

TAIWAN: IMPORTS OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		1986	1987	Sources, 1987	
				United States	Other (principal)
INDUSTRIAL MINERALS—Continued					
Stone, sand and gravel—Continued					
Gravel and crushed rock		6,216	11,545	510	France 6,277; Italy 2,023; Philippines 768.
Limestone other than dimension		22,080	503,794	—	Japan 337,919; Philippines 165,875.
Quartz and quartzite		1,573	1,349	34	India 380; Republic of Korea 366; Japan 163.
Sand other than metal-bearing		10,726	29,391	147	Japan 13,388; Malaysia 12,438; Republic of Korea 1,800.
Sulfur:					
Elemental:					
Crude including native and byproduct		60,515	17,893	199	Canada 12,894; Japan 4,800.
Colloidal, precipitated, sublimed		261,370	153,152	9,345	Canada 122,838; Japan 20,850.
Dioxide		28	13	(2)	Mainly from West Germany.
Sulfuric acid		125,521	159,940	193	Japan 159,713; West Germany 34.
Talc, steatite, soapstone, pyrophyllite		12,230	22,726	2,465	Republic of Korea 12,667; Thailand 2,740.
Vermiculite		1,146	561	4	Republic of South Africa 270; India 211; Philippines 40.
Other:					
Crude		r111,989	132,584	1,625	Republic of Korea 107,269; Japan 12,443.
Slag and dross, not meta-bearing		14,460	4,089	—	Japan 3,586; Republic of South Africa 213; United Kingdom 121.
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural		98	170	165	Japan 5.
Carbon:					
Carbon black		r9,221	16,769	4,060	Australia 6,924; Japan 2,111.
Gas carbon		61	165	13	Japan 105; Republic of South Africa 36.
Coal, all grades including briquets	thousand tons	11,003	13,382	4,253	Australia 5,843; Republic of South Africa 2,481.
Coke and semicoke		r157,705	214,172	62,652	Japan 144,303; Philippines 7,078.
Peat including briquets and litter		396	458	—	Netherlands 172; Finland 160; West Germany 70.
Petroleum:					
Crude	thousand 42-gallon barrels	126,337	141,326	356	Saudi Arabia 46,761; Kuwait 38,921; Oman 20,968.
Refinery products:					
Liquefied petroleum gas	do.	6,638	6,534	(2)	Saudi Arabia 5,080; Kuwait 492; United Arab Emirates 389.
Gasoline, motor	do.	(2)	2,672	528	Singapore 619; Saudi Arabia 427.
Mineral jelly and wax	do.	158	254	39	Japan 117; Indonesia 49.
Kerosene and jet fuel	do.	(2)	(2)	(2)	
Distillate fuel oil	do.	12,089	5,527	4,231	Kuwait 607; Singapore 590.
Lubricants	do.	596	708	257	Japan 222; Singapore 72.
Nonlubricating oils	do.	995	2,987	661	Saudi Arabia 862; Canada 400.
Residual fuel oil	do.	(2)	(2)	(2)	
Bituminous mixtures	do.	1	2	1	Netherlands 1.
Petroleum coke	do.	557	149	146	Japan 2.

r Revised. NA Not available.

[1] Table prepared by G. Jacarepaqua and Audrey D. Wilkes.

[2] Less than 1/2 unit.

[3] As reported by the Inspectorate General of Customs, Taiwan; however, a very low unit value suggests an error in unit of measure as reported.

[4] May include other precious metals.

[5] Total excludes unreported quantity valued at $723,000.

[6] Total excludes unreported quantity valued at $31,000.

total supply of energy is provided from domestic sources. The configuration of primary commercial energy supply is as follows, in thousand 42-gallon barrels:

Energy supply	1985	1986	1987	1988
Domestic:				
Electric power:				
Nuclear	44,882	42,092	51,759	47,889
Hydroelectricity	10,822	11,591	11,122	9,614
Natural gas	8,345	7,604	7,691	8,772
Coal	8,050	7,475	6,496	5,310
Condensate	743	663	933	879
Total	**72,842**	**69,425**	**78,001**	**72,464**
Imports:				
Crude oil	118,482	118,496	127,263	134,187
Coal	45,987	48,661	63,754	79,515
Petroleum products	11,208	25,129	19,235	37,186
Total	**175,677**	**192,286**	**210,252**	**250,888**
Grand total	**248,519**	**261,711**	**288,253**	**323,352**

During 1979–88, the average annual growth in energy consumption was 62%. In 1988, the highest growth rates in consumption by sector were metal products, 29.5%; transportation, 12.7%; industrial minerals products, 11.3%; and chemicals, 10.6%. During 1979–88, the consumption of energy by the mining sector had an average annual decline of 1.1%. In 1988, the rate of decline was 3.8%. The configuration of commercial energy consumption by industrial sector was as follows, in thousand 42-gallon barrels:

Industrial sector	1985	1986	1987	1988
Transportation	27,886	30,187	33,421	37,655
Chemicals	20,836	24,721	26,835	29,687
Metal products	19,098	21,470	22,312	28,905
Industrial mineral products	19,065	19,317	20,182	22,462
Energy	14,621	15,146	14,903	15,338
Mining	1,042	764	621	597
Other	114,123	125,078	136,774	147,900
Total	**216,671**	**236,683**	**255,048**	**282,544**

The energy consumption by the "Other" category in 1988, in thousand 42-gallon barrels, was composed of miscellaneous manufacturing, 16,650; textiles, 16,567; forest products, 9,296; agriculture, 8,948; food, 6,560; and miscellaneous sectors, 89,879.

[1] By E. Chin, physical scientist, Division of International Minerals.

[2] Where necessary, values have been converted from Chinese renminbi (RMB) to U.S. dollars at the rate of RMB3.72 = US$1.00 for 1988.

[3] By E. Chin, physical scientist, Division of International Minerals.

[4] Where necessary, values have been converted from Hong Kong dollars (HK$) to U.S. dollars at the rate of HK$7.798 = US$1.00 for 1987 and HK$7.806 = US$1.00 for 1988.

[5] By John C. Wu, economist, Division of International Minerals.

[6] Where necessary, values have been converted from Mongolian turgriks (Tug) to U.S. dollars at the rate of Tug 3.36 turgriks = U.S.$1.00.

[7] U.S. Embassy, Beijing, China. State Dep. Telegram Beijing 27517, Sept. 15, 1988, p. 3.

[8] Mining Journal (London). V. 310, No. 7959, Mar. 11, 1988, p. 205.

[9] Government of Mongolia (Ulaanbaatar). Proposal for the Development of the Copper and Molybdenum Deposit of Tsagaan-Suvarga.

[10] BBC Monitoring (Reading, England). Summary of World Broadcasts (SWB). Far East Weekly Report, Aug. 24, 1988, pp. 12–13.

———. Sept. 14, 1988, p. 9.

[11] Mining Encyclopedia (Moscow). No. 3, K–O, Mongolia (in Russian), 1987, pp. 386–391.

[12] Work cited in footnote 11.

[13] The British Sulphur Corp. Ltd. (London). Phosphorus and Potassium, No. 118, Mar./Apr., 1982, p. 15.

[14] By E. Chin, physical scientist, Division of International Minerals.

[15] Where necessary, values have been converted from New Taiwan dollars (NT$) to U.S. dollars at the rate of NT$28.55 = US$1.00 in 1987 and NT$28.56 = US$1.00 in 1988.